IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MARYLAND, SOUTHERN DIVISION

STAR SCIENTIFIC, INC.,

Plaintiff,

v.

R.J. REYNOLDS TOBACCO COMPANY,

Defendant.

Case No. AW 01-CV-1504

PLAINTIFF'S RESPONSE TO DEFENDANT'S SECOND SET OF INTERROGATORIES

Under Federal Rule of Civil Procedure 33, Plaintiff Star Scientific, Inc. ("Star Scientific") responds to Defendant R.J. Reynolds Tobacco Company's ("RJR") Second Set of Interrogatories [Nos. 16-27].

GENERAL OBJECTIONS

1. Star Scientific objects to the interrogatories to the extent that they request information that is covered by the attorney-client and/or work product privilege or any other applicable privilege.

2. Star Scientific objects to each interrogatory that purports to impose upon Star Scientific any obligation greater than or different from those required under the Federal Rules of Civil Procedure and the Local Rules and Orders of the Court.

Interrogatory No. 17:

Identify all studies (published or unpublished) of which Star is aware concerning the reasons for the formation of TSNAs in flue-cured tobacco, including, but not limited, to the "scientifically untenable studies" referenced in Star's Supplemental Response to Reynolds' Interrogatory No. 8.

Response

In addition to the General Objections, Star Scientific objects to this interrogatory as overly broad and unduly burdensome. RJR is intimately familiar with studies of nitrosamine formation and has produced extensive studies as part of its own discovery responses. Subject to these objections, Star Scientific states that pursuant to Fed .R. Civ. P.33(d), Star Scientific has produced all studies in its possession concerning the reasons for the formation of TSNAs in flue-cured tobacco. Although these studies can be found throughout Star Scientific's document production, many can be found at STAR 009368-009375, STAR 009725-009932, STAR 010218-010229, and STAR 010554-010565.

RJR has also produced studies (published and unpublished) concerning the reasons for the formation of TSNAs in flue-cured tobacco. Star Scientific believes that it is not necessary for Star Scientific to identify these studies, since they are part of RJR's own production. With the exception of the studies Star Scientific has already produced and those RJR produced, Star Scientific is not aware of any other relevant studies.

The "scientifically untenable studies" referenced in Star Scientific's supplemental response to RJR's Interrogatory No. 8 include all versions and editions of the paper entitled "Formation of Tobacco Specific Nitrosamines in Flue-Cured Tobacco" written by David M. Peele, Marvin G. Riddick, Mike E. Edwards, Jeff S. Gentry and Timothy B. Nestor, as well as any studies, presentations or publications that promote the same scientific theory.

VERIFICATION OF INTERROGATORY RESPONSES

I, Robert E. Pokusa, on behalf of Star Scientific, Inc., state that based on an investigation of information reasonably available at this time and in reliance on the accuracy of information supplied by others, the above Responses are true and correct to the best of my knowledge, information and belief

Executed on April 8th, 2002

By: _____
Robert E. Pokusa
General Counsel

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MARYLAND
SOUTHERN DIVISION

Certified Copy

CASE NO. AW 01-CV-1504
CASE NO. AW 02-CV-2504

- X
STAR SCIENTIFIC, INC.,
Plaintiff,
vs.
R.J. REYNOLDS TOBACCO COMPANY,
Defendant.
- X

DEPOSITION OF DAVID PEELE

Chicago, Illinois
November 14, 2002
REPORTED BY: Linda D. Hansen, CSR, RDR, CRR

The videotaped deposition of DAVID PEELE, taken pursuant to the Federal Rules pertaining to the taking of depositions, taken before Linda D. Hansen, CSR, RDR, CRR, a Notary Public within and for the County of DeKalb, State of Illinois, at the Offices of Brinks, Hofer, Gilson & Lione, NBC Tower-Suite 3600, 455 North Cityfront Plaza Drive, Chicago, Illinois, on Thursday, November 14, 2002, commencing at 9:08 o'clock a.m.

THE WITNESS: We would -- we would have what we would call a standard cure, which would be what we would model things against.

BY MR. MC MILLAN:

Q. Okay. So you -- oftentimes when you did these experiments, you did what you call a standard cure, and then you varied something from the standard cure to see what happened?

A. Yes, sir.

Q. Is that what you mean? Okay.

When you did the standard cure, did you attempt to make sure that you were doing what really happens in the real world as opposed to just something else?

A. Oh, no. It was -- it was a standard cure on the tobacco. The commercial tobacco that we grew at Avoca would follow the same standard cure.

Q. Okay. So try and -- trying to make that as real world as possible was important to you?

A. Yes, sir.

Q. Okay. Now, there were times when

the results you got were not what you expected; right?

A. Most cases they were not what I expected.

Q. Okay. Sometimes you got results that were inconsistent with the theory that you had at the time; right?

MR. GABRIC: Objection; vague.

BY MR. MC MILLAN:

Q. And that is a pretty lousy question. Let me -- let me try it again.

Oftentimes when you're doing this research, you -- you start with a particular hypothesis; right?

A. Yes.

Q. And -- and you do some tests to see whether or not that hypothesis proves out or doesn't prove out; right?

A. Correct.

Q. Okay. And when you have results that are inconsistent with the hypothesis, I take it one of your principles is to pursue that and try to get to the bottom of why that is?

A. Yes, sir.

Q. Okay. Is that standard scientific practice?

A. It is my belief it is.

Q. Okay. Okay. You -- you -- you've until -- well, even right now, you've worked at -- at Avoca throughout the period of these TSNA studies; right?

A. Yes, sir.

Q. Now, Avoca has a couple of unique aspects, I believe, one of which is that you grow tobacco right there at Avoca; right?

A. Yes, sir.

Q. And one of the things you know is that the chemical composition of that Avoca tobacco is different from other tobaccos in some respects, is it not?

MR. GABRIC: Objection; vague, lack of foundation.

THE WITNESS: I don't know what you mean by different, in what respects?

BY MR. MC MILLAN:

Q. I mean, tobacco grown at Avoca tends to have lower TSNA than tobacco grown -- other tobacco grown right around Avoca?

MR. GABRIC: Objection; vague,

lack of foundation.

BY MR. MC MILLAN:

Q. Isn't that true?

A. Tobacco cured in electric barns?

Q. No, I'm not talking about that. I'm talking about the tobacco. Here. Let me show you a couple of documents, might help.

(Peele Exhibits Nos. 272 and 273 was marked for identification November 14, 2002.)

BY MR. MC MILLAN:

Q. Let me show you what's been marked Peele Deposition Exhibit 272, which is a memorandum from Mr. Wendelboe to Mr. Hellman dated September 25th, 1997, and another document, 273, a memo from Mr. Wendelboe to a lot of different people, and attaching another memorandum.

MR. GABRIC: Do you have copies of those?

MR. MC MILLAN: Yeah.

BY MR. MC MILLAN:

Q. The first -- these -- I'm not -- these documents, I don't know if you have ever

seen these documents before, have you? You may have, I don't know.

A. I've seen them.

Q. Okay. The first one, the September 25th, 1997, memo says in the second sentence, quote, "The study was intended to confirm previous findings that tobacco grown at Avoca has lower TSNA than grown locally."

Do you see that?

A. I see that.

Q. Is that a correct statement, an accurate statement, in your view?

A. Well, I can't speculate to what Mr. Wendelboe was trying to say and why he would come up with that sentence.

Q. Okay. Well, let's take Mr. Wendelboe out of it.

Would you agree that you have seen findings that tobacco grown at Avoca has lower TSNA than grown locally?

A. I've seen findings that tobacco cured in -- in tobacco barns without the presence of nitric oxide from combustion fuels resulted in lower TSNAs.

Q. I don't think that --

A. And the tobacco was -- the tobacco was grown at Avoca that did that.

Q. I --

A. In my opinion and my belief is that the tobacco at Avoca has the same potential for producing TSNAs as tobacco produced in other areas.

Q. So you don't agree that the chemical composition is different?

A. Well, I didn't say about chemical composition being different. The chemical composition could be different.

Q. Well, is it different?

MR. GABRIC: Objection, lack of foundation.

THE WITNESS: We would have to review some data to determine what different meant.

BY MR. MC MILLAN:

Q. Okay.

A. Not -- not meant -- just actually what the data is.

Q. Well, let's look at data. Let's look at the other -- you've got that data right there front of you in the other exhibit.

type of tobacco, tobacco grown at Avoca has roughly half the TSNA as tobacco grown somewhere else?

MR. GABRIC: I'm going to object to that question, assumes facts not in evidence.

THE WITNESS: We would have to review the specific data.

BY MR. MC MILLAN:

Q. Okay. Did you also have some problem with -- with a large amount of variability in your TSNA data?

MR. GABRIC: Objection; vague.

THE WITNESS: The definition of large and large variability?

BY MR. MC MILLAN:

Q. Something you considered large.

A. My belief is we saw differences in treatments, but not necessarily large variability as far as -- I mean, I don't know what large variability -- there were treatment differences.

(Peele Exhibit No. 274 was marked for identification November 14, 2002.)

BY MR. MC MILLAN:

Q. Let me show you what's been marked Exhibit 274, Dr. Peele. That's an e-mail from Mr. Morton to you of January 24th, 1996.

You see in the second paragraph he says, "Particularly in the nitrosamine levels, there was a great deal of variability among the reps."

Do you know what he meant by that?

A. Let me read the article -- let me read the -- I recall the experiment. I do not recall if all the tobacco was treated and cured in the same type barns or not. And if the -- if there was a barn difference, that could lead to variability in the TSNA levels.

Q. It says down below he took the logarithm of the nitrosamine levels to try to make the variances more stable.

What does that mean?

A. I don't know.

Q. Have you ever done that?

A. Take -- no, sir.

Q. Okay. Let's go to the -- we talked earlier about the work you did on NNK

and the medical literature has another; is that what you are saying?

MR. GABRIC: Objection; vague, lack of foundation.

THE WITNESS: I can't speak for R.J. Reynolds' philosophy or --

BY MR. MC MILLAN:

Q. Okay.

A. -- or point of view on this.

Q. All right. But -- but your belief is that NNK has been implicated in humane diseases; is that right?

MR. GABRIC: Objection; lack of foundation.

THE WITNESS: I don't know.

BY MR. MC MILLAN:

Q. So you set about to study an NNK and NNN in these tobaccos, right, the ratio?

A. That's one of the elements we looked at.

Q. Did you reach any conclusions?

A. Up until the time that we discovered it was nitric oxide was the primary cause, we didn't reach any conclusions.

Q. Okay. So that NNK study --

NNN/NNK -- NNK to NNN ratio study was what we might call a dry hole?

A. Inconclusive.

Q. Inconclusive, okay.

What about the accelerated drying study? What did you do there and -- well, let's start with the conclusions and work back.

Did you reach any conclusions based on that?

A. Inconclusive again.

Q. Inconclusive. Another, what I would call, dry hole?

MR. GABRIC: Objection.

THE WITNESS: Not necessarily dry hole, but we could not induce TSNA formation in that tobacco. And, therefore, when we measured the treatment of the accelerated drying or cure, whatever you want to call it, against the control of the standard cure in the electric barns, or whatever we do it in, we could not see any cause and effect.

BY MR. MC MILLAN:

Q. Okay. So you -- in other words, you did not see any improvement or

tendency to be closer together.

MR. MC MILLAN: Why don't we take a short break.

THE VIDEOGRAPHER: Off the record at 3:56.

(Recess taken from 3:56 to 4:14.)

(Peele Exhibits Nos. 307 to 319 was marked for identification November 14, 2002.)

THE VIDEOGRAPHER: Back on the record at 4:14, please proceed.

BY MR. MC MILLAN:

Q. Dr. Peele, I'm showing you Exhibit 307.

In September of 1999, you presented an article which I think I've just shown you as Exhibit 307; is that right?

A. We wrote a paper to go along with our Coresta presentations.

Q. Right. Is that the paper?

A. Yes, sir.

Q. Okay. And that was presented in September of 1999; am I right?

A. The first time.
Q. For the first time.
It's since been presented how many times, would you say?
A. I would estimate somewhere between 25 and 30.
Q. Is that 25 and 30 by you or 25 and 30 by some Reynolds person?
A. I have presented all of them except for the first one, which was Dr. Dave Townsend at the Coresta meeting in Austria, and then Dr. Jeff Gentry reported -- reported it the second time at TSRC or TRCS, whatever -- the Tobacco Science Research Conference somewhere outside the country; and then I presented it for the first time at the Coresta Agrophyto meeting in China.
And then since that time, I have presented this paper.
Q. Okay. By the way, are you familiar with the indirect flue-curing methods used in China?
A. I did not visit any tobacco-producing areas in China. We only went to one hotel the whole time I was there. So

the answer is no.

Q. Okay. All right. Now, in 1997 when you were conducting experiments, and for that matter in previous years, you had been operating under the assumption that TSNAs in flue-cured tobacco were created in some fashion or another by a microbial function; is that right?

A. We were following the general -- generally accepted hypothesis that nitrite -- nitrite breaks down to NOX via denitrifying bacteria.

Q. Right. So you were proceeding along the hypothesis that it was the microbes that were doing it?

A. Yes, sir.

Q. Okay. And sometime between 1997 and your presentation in September of 1999, you concluded that the microbes weren't doing it, is that right, in flue cured?

A. No, sir. We determined that the microbes could still produce some TSNAs, but the large majority of the TSNAs were produced by the presence of nitric oxide from the burning of LP gas.

Q. Okay. And how did you come to that conclusion?

A. We had been studying, as the record shows, in 1997 the effect of carbon dioxide or what we believe the effect of carbon dioxide under the premise that something about carbon dioxide was affecting TSNA levels.

Q. Perhaps by creating an anaerobic environment?

A. No; just -- just we didn't know what the mechanism was.

Q. But you knew one possibility was it might be creating an anaerobic environment?

MR. GABRIC: Objection; form, vague.

THE WITNESS: I do not understand your definition of anaerobic environment.

BY MR. MC MILLAN:

Q. Well, there are various RJR documents that use the term anaerobic environment. Are you aware of that?

A. Somewhere in this pile this morning, we may have seen that. I -- I don't -- I'd have to go back and look.

Q. Okay. Well, in any case, you were studying CO2, and then what happened?

A. One day we were -- I was, you know, contemplating the data from 1997, and it occurred to me to ask the question: What other gases are present when you burn propane gas?

I knew of a former college student who had worked at our facility for several summers who got her degree in chemical engineering from NC State University, and she at that time was employed by an environmental firm outside the Raleigh area. So I called Ms. Norvell and asked her if she could tell me what the other components were when I burn propane gas.

Q. And this was in May or June of 1997?

A. May or June --

Q. I'm mean, excuse me, 1998?

A. June -- May or June of 1998.

Q. Was it in June of 1998, as best you recall?

A. I believe it was in June of 1998.

Q. Okay.

A. She sent me a --
Q. And that's when you had this idea?
A. That's when I had this discovery.
Q. This discovery.
A. She sent me a spreadsheet that showed from the standard EPA handbook on pollutants if you burn under conditions -- so many gallons of propane gas, you will produce X quantity of different pollutants.
Q. That's Exhibit 308; is that right?
A. That is Exhibit 3 -- Exhibit 308.
Q. Okay. Then what happened?
A. As soon as I saw the NOX present and saw that when you burn a thousand gallons of LPG, you produce 14 pounds of NOX, I took out my calculator, calculated what the amount would be in a typical commercial barn, direct-fired barn that we had at Avoca, where we had measured the gallons of fuel, took that ratio and came up with an appropriate number for how much NOX was being exposed to tobacco.
Q. And what was that number?
A. Well, looking at the next -- there is another spreadsheet that goes with this --
MR. GABRIC: Do you have a

copy of 308? Are these all the ones you've marked? Thank you.

THE WITNESS: The number -- the number generally is between two and four pounds of NOX per cure depending on the number of gallons of fuel that the individual person curing the barn of tobacco is going to use.

BY MR. MC MILLAN:

Q. Okay. So then what did you do?

A. We had already, prior to that time, back in the earlier part of, you know, late spring, early -- I mean, early spring, late winter had looked at modifying two of our tobacco barns, two of our electric tobacco barns to put in direct-fired propane burners --

Q. Why?

A. -- and we --

Q. Why had you done that?

A. Why did we do that?

Q. Yeah. Why did you look at that?

A. We were still -- at that time we were doing that, we were still under the premise that carbon dioxide was going to have some affect, and so we went out and -- and talked to a supplier, who was BulkTobac in

Charlotte, North Carolina --

THE REPORTER: I'm sorry. Was what?

THE WITNESS: BulkTobac and Frank Horn, Senior, who was the owner of the company, and talked with Frank about if I could buy a small direct-fired propane burner that would approximate the same Btu's that our electric furnaces were in our electric barns.

And subsequently, we bought those -- those burners and installed the burners in our barns.

So the only change we made in those barns was to lower the fans, as you saw in your inspection, and put the propane burner above the fan to make the --

BY MR. MC MILLAN:

Q. Lower them, you mean --

A. Physically drop it down in the barn.

Q. Less -- less high off the ground?

A. Less high off the ground.

Q. Okay. And the reason you were doing that was you wanted to get rid of CO2?

A. The reason I lowered the -- the

--

Q. No; the reason you were getting these --

A. No. The reason I got them is because I wanted to introduce CO2 --

Q. Oh.

A. -- into those electric barns, in that same barn configuration.

So now the only thing would be -- difference would be I would have two electric barns and two direct-fired propane barns sitting side by side that I knew were -- in all other facets were similar.

Q. You wanted to do that so you could see whether or not there was any effect of CO2?

A. Yes, sir.

Q. Okay. So then you -- and before you got on with any of that experiment --

A. Before I got on --

Q. -- you had this idea about NOX and you contacted Ms. Norvell?

A. We contacted Ms. Norvell.

Q. Then what happened?

A. We really -- there was nothing we

could do until we started getting tobacco that we could harvest at Avoca.

So we ran the first series of experiments in early August, where we took tobacco in one electric barn, two propane barns, two direct-fired that we'd converted, and one or two -- I don't remember exactly, but I know there was at least one -- direct-fired commercial barns at Avoca that we had been currently curing in.

The tobacco was not produced on Avoca. The tobacco was produced by a gentleman named Ari Taylor on his farm that he harvested tobacco and brought it to us.

Our people racked the tobacco up, put the tobacco in the boxes, uniformly loading the boxes so that everything was uniform, and we cured the tobacco. We measured the -- you know, the temperatures like we would normally do on any -- on any cure that we're doing. We also took samples that -- into that and measured TSNA.

Q. Okay. Then what -- what did you do?

A. After that we repeated the

experiment again, and we repeated the experiment the next time --

Q. The -- the experiment you repeated is the same experiment?

A. Same experiment, same.

Q. Okay. So -- and this is the -- the experiment reported at the bottom of the fourth page of your article --

A. One, two --

Q. -- or are you talking about something else?

A. Hold on. That is the -- that is the data that we reported.

Q. Okay. Then -- then what did you do?

A. After the -- we repeated that the second time, and I -- I do not recall the -- you know, exactly the dates. We had a meeting in Winston-Salem, at which time Dr. Gentry was -- Dr. Jeff Gentry was present, Dr. Dave Townsend was present, Dr. Gary Burger, who was the executive VP of R & D was there; I don't really recall if Mr. Borschke was there or not, and my immediate boss was Mr. Frank Sellers.

And we disclosed to them that

we had worked this series of experiments that proved that it was the addition of -- or the elimination of nitric oxide that prevented TSNAs, that gave us low TSNAs.

Q. Okay. Was this -- I'm going to show you Exhibit 309.

MR. GABRIC: Could I have -- thank you.

BY MR. MC MILLAN:

Q. This is a memorandum from you dated September 4th, 1998.

Was this meeting you're describing before or after this meeting?

A. It would have been before this.

Q. Do you remember the date of the meeting?

A. No, sir.

Q. And -- and what did you say you had --

A. We presented the results of what we had done with these -- at least the first cure, and I can't honestly remember whether it was the first cure or the second cure.

But we -- we showed them the data where we had found that there was NOX in

the combustion gases, and we showed them data where we had cured the tobacco in the electric barns, the small eight red barns that had been converted to direct propane, or direct-fired propane, and also the commercial barns at Avoca that were direct-fired propane.

Q. But at this point you didn't know whether the reason for the difference was the NOX or the CO2, did you?

A. Yes, I did. I knew it was NOX.

Q. Why is that?

A. Because of the generally accepted hypothesis that it's NOX that reacts with TSNAs, that reacts with the alkaloids to form TSNAs.

Q. Well, I thought you said a few minutes ago that you had a hypothesis that it was this presence of CO2 that was creating TSNAs.

A. I did up until the time I talked to Ms. Norvell.

Q. Well, okay. But at one point you had a hypothesis that it was CO2 that was creating TSNAs, and at another point you had a hypothesis that it was NOX that was creating

TSNAs; right?

A. That's correct.

Q. But the first set of experiments you did didn't tell you the answer to which it was, did it?

A. The first set of experiments told me that it was the presence of NOX.

Q. Well, why did it tell you it was the presence of NOX as opposed to the presence of CO2?

A. Because the only difference between those -- the measurable difference was the introduction of NOX due to the direct fire of propane gas.

Q. But you didn't introduce any -- you didn't introduce any separate NOX in these first experiments, did you?

A. No, it was just what was come off the burner.

Q. Right. And what came off the burner was NOX and CO2; right?

A. That's correct.

Q. So if someone had walked up to you and said, "Well, you know, Dr. Peele, your NOX theory is really crazy; it -- it's got to

be CO2 that's causing it," are you suggesting you had some experiment that you'd done that could disprove that?

A. No. I'm suggesting that they told me that I was crazy to believe it was CO2 that was doing it.

Q. Okay. But the first experiment that you actually did to demonstrate that it was NOX as opposed to CO2, was in September of 1998, is that right --

MR. GABRIC: Objection; vague.

BY MR. MC MILLAN:

Q. -- in response to this memo?

MR. GABRIC: Referring to 309?

MR. MC MILLAN: Yes, not that memo.

THE WITNESS: 309.

BY MR. MC MILLAN:

Q. 309, right.

A. No, I believed that on the day that Dana Norvell told me that there was NOX in that tobacco, that would be the primary source of TSNA formation in flue-cured tobacco.

Q. Well, I understand you said that's what you believed, but my question is: Isn't

it true that on September 4th, 1998, you proposed an experiment to evaluate the effect of NOX gases on TSNAs?

A. We did do an experiment, as is described on this page --

Q. And this is the first NOX test?

A. -- to see that if we could -- well, it is the first NOX test that we used an external source of nitric oxide other than the burner.

Q. Right. So you then went ahead and performed some version of a NOX test; right?

A. We performed this, this test as --

Q. Actually, you didn't perform this test, did you? This test for the last 24 hours of yellowing and first 24 hours of leaf drying, you were going to introduce NOX, but that's not what you did, is it?

A. No. We changed -- because we could not get a flow rate such that we could cover it during that 24-hour period.

Q. What --

A. That 48-hour period.

Q. What do you mean, you could not

get a flow rate?

A. The metering valves that we had access to -- to us, at Avoca, in this time period, when we went out to calibrate those, the lowest readings that we could get down to were approximately one pound in a 24-hour period.

Q. All right. So what exact test did you then run?

A. We ran an exact test where we introduced -- well, let's see. We introduced 1.8 kilograms of nitric gas during the last 24 hours of the yellowing period.

Q. And did you introduce it all at once or did you introduce it over --

A. We introduced it over a 24-hour period.

Q. So 1/24 of it every hour?

A. It was -- it was calibrated out just to give a constant flow so that over the 24-hour period, it would deliver 1.8 kilos.

Q. Did you do something to the barn to make sure the NOX would stay in there?

A. Closed the damper.

Q. Did you seal it somehow?

A. No, sir, not that I recall.
Q. Okay. And then at the same time, you ran a control barn with one of the electric barns that was just operated normally?
A. Yes, sir.
Q. Okay. And then so that was one test that you ran.
And then you ran that test a second time or a similar test a second time; am I right?
A. Without looking at my --
Q. Here. I can --
A. If you got the big data sheet.
Q. Well, let's just start with your article.
You see right in the -- in the middle of -- there is a page with table 2?
A. Yes, sir.
Q. Do you see table 2 there?
A. I'm on that page.
Q. Okay. That -- that was the first NOX experiment results; right?
MR. GABRIC: Objection to the form of the question.
THE WITNESS: Table 2 was the

first experiment under which exogenous NOX was added to the tobacco.

BY MR. MC MILLAN:

Q. Yeah. And you referred to that as the first NOX experiment?

MR. GABRIC: Objection --

BY MR. MC MILLAN:

Q. Right?

MR. GABRIC: -- to the form of the question, puts words in the witness' mouth.

THE WITNESS: There was an experiment before we started adding exogenous NOX to it where we cured the tobacco twice with just electric and direct-fired propane in a standard, commercial direct-fired barn at Avoca.

BY MR. MC MILLAN:

Q. And that's this table 1?

A. That's in table 1.

Q. Then after the -- after table 2, there is some language that says, starting in the second sentence, "Tobacco was loaded into two of each electric R & D barns," et cetera, "as in the previous experiment, the tobacco was yellowed for 48 hours," et cetera, "the tobacco

was sampled just prior to any" X -- any NOX treatment and subsequently on a 12-hour schedule. Finally, the tobacco was sampled at the end of cure."

So that was a third test you ran; correct?

A. Yes, sir.

Q. And then you graphed those -- the results of the third test in figure 2?

A. Yes, sir.

Q. Okay. Now, in each of these three tests -- the first one what you did was just an LP gas versus electric, and then the second and third tests, where you introduced NOX gases.

In each of those three tests you had one electric barn they used as a control; is that right?

A. Yes, sir.

Q. And were -- was that set up the same in each of the three experiments?

A. The same barn or the same what? Set up -- set up the same --

Q. Same -- you cured it the same, you tried to do everything the same?

A. We tried to do everything the same.
Q. As between all three?
A. Yes, sir.
Q. Okay. And in -- in one of those -- in the first test you report zero TSNA.
Now, that's not a -- a real number, I take it, because what you really mean is that it was simply below detection?
A. Non-detect would be -- you could substitute -- you could put non-detect there.
Q. Right. And your detection limits were what?
A. Again, I told you I -- I'm not a chemist, so I can't speak on detection limits.
Q. Okay. But in any case, we can be pretty confident that TSNA was higher than zero?
A. It was non-detect.
Q. Okay. And then in the second test, your electric control barn showed up with one part per million; is that right?
A. Yes, sir.
Q. And do you know what it turned up in the -- in the third test?

Here, I will give you a little help. Take a look at Riddick Exhibit 236, and if you go to --

MR. GABRIC: Do you have a -- Rick, may I have a copy?

BY MR. MC MILLAN:

Q. There is a page where you will find NOX test 2, end of cure.

Have you got that?

A. NOX test 2, end of cure. That's what you asked about.

Q. That's the -- that's the -- that's the results of this third test, right, the second NOX text, but third test overall?

MR. GABRIC: In fairness to me, I would appreciate having a copy of the document before questioning.

MR. MC MILLAN: I'm sorry. I just don't happen to have one.

MR. GABRIC: I think Jonathan has one.

MR. MC MILLAN: Oh.

MR. GABRIC: Where are you, Dave?

THE WITNESS: NOX test 2, end

of cure.

BY MR. MC MILLAN:

Q. Okay. So that was the third test that's reported in -- in your article on figure 2; is that right?

MR. GABRIC: Could I have that question back, please?

(Question read.)

THE WITNESS: Okay. Sir, what is the question?

BY MR. MC MILLAN:

Q. The results of the second NOX test are what are reported in figure 2 of your article?

A. Figure 2 of the article is NOX test No. 3.

Q. Right -- no, it's NOX test No. 2 -- well, it's what you call No. 3, but it's -- let's go back to square one here.

You did a test in August in which you didn't introduce any NOX; right? And that's reported in table 1 of your article.

A. Without going back and looking at the numbers on table 1 in the article, I do not recall whether that is the average of the

test on this exhibit -- really, Exhibit 236 being the test started on 8/13, the 8/13/1998 and the 8/24/1998.

Q. Okay. And then in any case, there was a second test, and you've already described the second test. It shows up, I believe, on the page NOX test 1, and that's reported in table 2 of your article; right?

MR. GABRIC: I will object to the form of the question.

BY MR. MC MILLAN:

Q. Do you see NOX test 1 on 9/21/98? Barn 20 was your control barn, and the TSNA results are 1.4, .5, 1.6 and .4? Do you see that?

MR. GABRIC: Do you see that? Where are you referring to?

Would you read that back to me, please.

MR. MC MILLAN: Here, let me see if I can find it for you.

BY MR. MC MILLAN:

Q. Okay. Let's look at table 2 of your article where you're showing TSNAs of 1 for your control barn, and I believe that shows

up as sample 78A, 79A, 80A and 81A on Exhibit 236; is that right?

MR. GABRIC: I just caution you, Dr. Peele, you are entitled to look at whatever documentation you need to look at.

THE WITNESS: And the -- and the question, so I understand the question, is?

BY MR. MC MILLAN:

Q. The data you used, the data that was the source data for table 2 of your article is the data that shows up in Riddick Exhibit 236 of sample 78A, 79A, 80A and 81A? I'm just asking for your confirmation of that.

A. Yes, sir.

Q. And the table that formed the basis -- excuse me -- the data that formed the basis for figure 2 of your article, figure 2, which is the graph, is entitled NOX test 2, end of cure, that is on the next page -- NOX test 2? NOX test 2, end of cure.

And for the control barn on the NOX -- the control barn that you used that shows up in figure 2 of the article, that comes from the data for samples 126A, 127A, 128A and 129A on Exhibit 236; correct?

A. No, sir.
Q. Well, where is the data that's --
A. It is NOX test 3.
Q. What was NOX test 2?
A. The repeat of NOX test 1.
Q. NOX test 2 was a repeat of NOX test 1, NOX test -- okay.
Done the same way?
A. Done the same way.
Q. Okay. What was your control data for NOX test 3?
A. If you look at -- on -- I don't know what -- on the page that has NOX test 3, 60 hours yellowing, gas introduced starting at 36 hours and running for the last 24 hours at zero hours, it talks about the one, two, three, four -- the fifth column over talks about barn numbers, 19, 20 and 26.
26 is a four-rack electric barn at Avoca.
Q. Well, according to your article in this second NOX test, one barn received one pound of NOX and the other barn received four pounds of NOX.
A. Uh-huh.

Q. That's the amount that you put in the small electric barns; correct?

A. That's the amount we put in barns 19 and 20. Barn 19 received the one X and barn 20 received the four X.

Q. Okay. Let's go back to NOX test 2.

The TSNA results that you observed on your control barn in that test ranged from 2 to 3.2; is that right?

A. Yes, sir.

Q. Why didn't you report those results in your article?

A. We elected just to report the first -- the first test we did.

Q. All right. Why did you elect to leave out the higher results?

A. I don't think there is a specific reason.

Q. When you conducted these NOX tests -- well, actually, first of all, let me show you what's been marked as Peele Exhibit 310. Peele Exhibit 310 is a handwritten document.

Do you recognize the handwriting?

MR. GABRIC: May I have a copy of that? This is -- thank you.

BY MR. MC MILLAN:

Q. Do you recognize that handwriting?

A. I can't definitively say which of two persons it could be.

Q. Okay. Which are the two persons?

A. One is Mike Edwards and the other one is Herbert Copeland.

Q. Okay. This appears to be a set of some additional testing dated September 22nd, 1998, for 4.3 pounds of NOX over 24 hours. Do you know what these results are?

I don't think you are going to find these reports -- these results reported in Exhibit 236. And you anticipated my next question, I think, in your pause, Dr. Peele, which is: Why not?

A. Why not?

Q. Does this appear to be another test that was run, same test, this NOX addition test?

A. It was not another experiment run.

What I can't tell from this -- from this document is whether or not this was

just a grab sample taken at the end of the cure before the tobacco was ordered back up.

Q. Well, in any case, for the control barn the -- the TSNA results were 1.6 parts per million; is that right?

A. R No. 20 electric without NOX, 1.6 part per million.

Q. Okay. So are you saying this is some other -- what -- what test is this? Does it correspond to any of the tests we've been talking about?

A. From the information presented, I cannot tell you whether it responds to what we call NOX test 1 or NOX test 2.

Q. Well, it doesn't seem to correspond to either one, does it, because it says TSNAs are 1.6.

Do you know of any way this test corresponds to any other test?

A. I cannot tell from this information how the data presented in that corresponds to the data over here. I don't have -- I don't have any other information in front of me.

Q. Okay. Peele Exhibit 311 is a

different version, some of the same test data.
Do you recognize that handwriting?
A. Yes, sir, that's my handwriting.
Q. Where it says "first NOX gas," is that your handwriting?
A. Yes, sir.
Q. What's the date of the first NOX gas test according to that?
A. Well, there is no date on this.
Q. What's the sample number?
A. 70A.
Q. Okay. That would correspond to sample 78 on Exhibit 236; is that right?
A. Riddick 236.
Q. So that would be September 21st?
A. Grab sample.
Q. September 20 -- the date is September 21st; is that right? No.
We are talking at 78, I thought you said.
A. 70A.
Q. Oh, 70A, sorry. I have the wrong date. So, yeah, September 21st, grab sample.
Okay. I'm going to show you

Exhibit 312. That's some additional data that you received from Ms. Norvell on about September 23rd, 1998, according to the fax; is that right?

A. Yes, sir.

Q. And if you look at the table 1.5-1, do you see some NOX data listed there?

A. Yes, sir.

Q. Did you use any of that for purposes of calculating how much NOX to introduce into your barns in your 1998 experiments?

A. The best I can tell from the line as through the line, it would have been the propane emission factor for commercial bollers.

Q. 14 pounds?

A. 14 pounds.

Q. Okay. Now, what you introduced into your barns was NO gas; right? It wasn't NO2, it wasn't NO 3; it was NO?

A. It was NO.

Q. Pure NO; is that right?

A. In the cylinder, it was pure NO.

Q. Right. But this data is expressed in the form of NO2, isn't it? If you look at

figure -- or footnote F?
A. That's what it says.
Q. So, in fact, if you were using NO2 data that you got from Ms. Norvell but introduced NO into your barns, you were actually introducing quite a bit more NO than was justified by the calculation; is that right?
MR. GABRIC: Could I have the question back, please?
MR. MC MILLAN: Let me -- let me ask the question again.
BY MR. MC MILLAN:
Q. NO has quite a bit more nitrogen in it than NO2 on a weight basis; correct?
MR. GABRIC: Objection; foundation.
BY MR. MC MILLAN:
Q. Do you know that?
A. Chemistry would tell you that.
Q. Okay. And would you agree with me, Dr. Peele, that if you used -- if you assumed this 14 pounds was based on NO instead of NO2, then you made an incorrect calculation?
MR. GABRIC: Objection; form of

the question, vague.

THE WITNESS: I would need to go back and review the data sheets from the time period where I did these calculations.

BY MR. MC MILLAN:

Q. As you sit here today, do you believe that you based the calculations on NO rather than NO2?

MR. GABRIC: Objection; calls for speculation.

THE WITNESS: I don't recall. I'll have to check the sheets.

BY MR. MC MILLAN:

Q. Now, as a -- as a practical matter, Dr. Peele, apart from any mistakes you made with respect to the NO calculation, you intentionally introduced more NO into these barns than you would have expected in a normal direct-fired cure; correct?

MR. GABRIC: I will object to the form of the question.

THE WITNESS: The design of the experiment was such that typically when you're doing experiments, you look at a -- a dose effect.

BY MR. MC MILLAN:

Q. What do you mean by a dose effect?

A. If -- if the recommended dose is X, typically you look at half X, one X, two X, four X, eight X, multiply it up in multiples.

Q. And the idea is if you put something in at two X and then you put it in at one X, you want to see if the TSNA results are twice as high in the two-X world as they are in the one-X world?

A. You want to see if there is a -- a response to the more NOX you add, if there is more TSNAs.

Q. Okay. Well, you knew -- you made a calculation as to exactly how much NOX was -- would have been introduced in a direct-fired barn; correct?

A. I made a calculation based on a range -- a -- what I believe to be an average value for the gallons of propane gas that would be burned in a typical cure.

Q. Right. And that was -- according to your article, it was .18 kilograms?

A. The article now --

Q. Table 1.
A. In the little LP gas, that's correct.
Q. Okay. So you knew when you were running these experiments that if you wanted to introduce the amount of NOX gas that would most closely represent what you'd actually expect to see in the real world, the correct amount was a little less than two-tenths of a kilogram; is that right?
A. Based on the calculation.
Q. And the -- have you ever run an experiment, Dr. Peele, in which you used about two-tenths of a kilogram?
A. No, sir.
Q. Have you ever asked anybody to run such an experiment?
A. No, sir.
Q. Do you know of anybody who has run such an experiment?
A. Not that I recall.
Q. If you wanted to determine what the real effect of .2 kilograms of NOX was in a barn, why wouldn't you run that experiment?
A. Again, it goes back to the

equipment that was available to me the day that I was running the experiment, and we wanted -- in -- in our way of thinking, we had a zero value, we had a two-tenths value, so we wanted to move it on up on this multiple factors of the dosage rate.

Q. And, in fact, this two-tenths factor in a real barn would have been introduced over a period of about six days; right?

A. The length of the cure.

Q. So you're really talking about .03 kilograms per day; right?

A. No, sir, because it depends on how much the burner is burning.

Q. Okay. Well, on average what would you say it was?

A. Well, you can't say on average because it varies during the cure.

Q. Okay. Well, during the cure, what would be the biggest day, let's call it the high point?

You take this .18 kilograms and spread it over six days, what would be the day on which you had the absolute highest amount of

NOX gas?

A. It would be during the time that you're ramping the temperature and increasing the -- increasing the temperature.

Q. How much would you expect that would be on your maximum day?

A. I -- I'd have to figure out some way to calculate that.

Q. Well, give us an --

A. I'd have --

Q. -- an approximation.

MR. GABRIC: Objection; foundation.

THE WITNESS: I'd have to know how many gallons of fuel were burned during -- during that day period.

BY MR. MC MILLAN:

Q. Okay. Well, just for today's purposes, we'll just agree that on any given day, then, the real NOX in the real world would have been significantly less than .18, significantly less, in other words, than approximately two-tenths of a kilogram?

MR. GABRIC: Object to the form --

BY MR. MC MILLAN:

Q. Is that right?

MR. GABRIC: Object to the form of the question.

THE WITNESS: Repeat your question, please.

BY MR. MC MILLAN:

Q. Well, I -- we can probably -- I think the mathematics will probably work out for themselves, Dr. Peele, so let me just go on.

In fact, as you said, you never used two-tenths or any number very close to two-tenths, did you?

MR. GABRIC: Object to the form of the question; it's vague, ambiguous, mischaracterizes the record.

BY MR. MC MILLAN:

Q. How many kilograms did you introduce?

MR. GABRIC: Same -- same objections.

THE WITNESS: The paper states that in one test we introduced 1.8 kilos of NOX gas during a 24-hour period, and in the

second test we introduced .5 kilos of NOX gas and also 1.8 kilos of NOX gas.

BY MR. MC MILLAN:

Q. Now, when you introduced the high side of that, you got a huge amount of TSNAs; right?

MR. GABRIC: Object to the form of the question.

THE WITNESS: According to figure 2, at the high level, we were -- TSNAs greater than 100 parts per million.

BY MR. MC MILLAN:

Q. What were the amounts again that you said you introduced, the high amount and the low amount?

A. From Bats [sic] article 9232.

THE REPORTER: From which article, I'm sorry?

THE WITNESS: I mean, from the Bats-numbered document of 9232, we introduced 1.8 kilos of NOX gas during 24-hour periods, and we introduced, for the second experiment, another experiment, .45 kilos and 1.8 kilos.

BY MR. MC MILLAN:

Q. Okay. So in one version you

introduced four times what you introduced in the other version?

A. In the second -- in the experiment on the second example I gave, we introduced four times what I did.

Q. Okay. Did you get four times the TSNAs?

A. Well, again, from figure 2 we've got roughly 100 parts per -- a little over 100 to maybe 110 parts per million, to interpolate the graph; and on the other one we were plotting at the end of cure -- I don't know, 10, 12, 14, I don't know what the number is, 10 maybe.

Q. So, in other words, when you had four times -- well, actually, it's not four times the real world, it's -- how many times the real world is that?

A. I've not calculated it, sir.

Q. Okay. Did you get the ratio of NNN and NNK that you expected?

MR. GABRIC: Object to the form of the question.

THE WITNESS: I'd have to go back and review the data because we reported on

this data in TSNAs.

BY MR. MC MILLAN:

Q. The TSNA data -- the ratio of NNK to NNN that you expect in a direct-fired environment is -- you expect higher NNK; right?

A. That is what we generally saw.

Q. All right. So if it's -- if it's the nitric oxide gases in this direct-fired environment that are causing TSNA, would you expect to see higher NNK?

MR. GABRIC: Objection; lack of foundation.

THE WITNESS: We saw higher values of NNN than NNK in the experiments that we added the NOX gas.

BY MR. MC MILLAN:

Q. But that doesn't answer my question, Dr. Peele.

My question was: If it was nitric oxide that was causing TSNAs, then you would expect that there would be more NNK produced; right?

MR. GABRIC: Object.

BY MR. MC MILLAN:

Q. More NNK, less NNN?

MR. GABRIC: Object to the form of the question, lack of foundation.

THE WITNESS: Not being a chemist, I cannot speak for how stable -- for the way I understand my layman's terms of chemistry, is that NO is not a stable form of nitric oxide; and, therefore, it changes almost instantaneously in the atmosphere to other species.

BY MR. MC MILLAN:

Q. Changes almost instantaneously to NO2, doesn't it?

MR. GABRIC: Object to the form of the question; no foundation, calls for this witness now to speculate.

THE WITNESS: I don't know.

BY MR. MC MILLAN:

Q. But in any case, you had studied the NN -- the ratio between the NNK and NNN in flue-cured tobacco that was direct-fire cured. You'd studied that; right?

MR. GABRIC: Object to the form of the question.

THE WITNESS: We'd observed data.

BY MR. MC MILLAN:

Q. Well, you studied the specific issue of the ratio. That was one of the experiments that you specifically did in 1995; correct?

A. But I do not recall the exact conclusions from that experiment.

Q. But you know for a fact, because you've been in this business for years and years and seen this data for years and years, that in a direct-fired environment, you expect to see NNK values higher than NNN in flue-cured tobacco; correct?

A. General rule of thumb, yes.

Q. Right. And so if you were conducting a test that accurately mimicked what happens in the real world in a direct-fired environment, you would expect to see NNK higher than NNN, wouldn't you?

MR. GABRIC: Objection; calls for speculation, no foundation.

THE WITNESS: I don't have the background in chemistry to be able to tell you how the species are going to move around.

BY MR. MC MILLAN:

Q. Well, did you observe the fact in your results, Dr. Peele, that instead of NNK being higher than NNN, it turned out that NNN was roughly ten times higher than NNK?

I think you can find that on NOX test 1. Do you got that?

A. NOX test 1, the statement you made is true for samples 70 -- for barn 19, but it is not true for barn 82.

Q. In barn 82 --

A. I mean, barn 21.

Q. In barn 21 it's not ten times higher, it is only something about five times higher; is that right?

A. That's what it looks like from the math.

Q. Okay. And by comparison, when you tried to just have a regular direct-fired environment, that's -- shows up in -- in the sample 86; right?

A. Barn 22.

Q. Barn 22.

And there, again you see NNK values roughly twice as high as NNN values; right?

A. That's what the data shows.

Q. Have you ever tried to get to the bottom of the fact that although direct-fired environments seem to have high NNK values, your NOX test had NNN values that were five to ten times higher than NNK? Have you ever tried to figure out why that happened?

A. I did not try to figure that out.

Q. Did you ever figure out why in the TSNAs that you were reporting, at least in some of the cases, 90 percent of it was NNN?

MR. GABRIC: Object to the form of the question. It's vague.

THE WITNESS: After we did these series of experiments, I do not recall going back and looking at those ratios ever again.

BY MR. MC MILLAN:

Q. You just published the same data over and over and over again and didn't do any further work; is that right?

MR. GABRIC: Object to the form of the question, it's also argumentative.

THE WITNESS: I do not recall repeating that experiment again in these

subsequent years.

BY MR. MC MILLAN:

Q. Now, would you expect -- based on your scientific background that if NOX is really reacting the way you think it is, would you expect that there would be more of that reaction where the temperatures were higher?

MR. GABRIC: Objection; lack of foundation.

THE WITNESS: I do not know.

BY MR. MC MILLAN:

Q. You're not aware of the fact that a chemical reaction of this sort is going to proceed faster when the -- under higher temperatures and slower under lower temperatures?

A. That's not --

MR. GABRIC: Objection.

THE WITNESS: -- my field of expertise.

BY MR. MC MILLAN:

Q. So that subject has never come up?

A. Not that I recall.

Q. Have you ever noticed that your results show just the opposite?

talking to that you've never actually introduced into a barn the amount of NOX that you'd actually expect in the real world?

MR. GABRIC: Objection; form of the question, mischaracterizes the record. He's got direct-fired barns in his paper.

THE WITNESS: My belief is that the paper -- that the data presented is accurate.

BY MR. MC MILLAN:

Q. Well, my question is: Have you ever told any -- any of the people you were speaking to on these 25 or 30 occasions that when you did experiments that introduced NOX into your barns, you never introduced the amount of NOX that corresponds to what you see in the real world? Did you ever tell anybody that?

MR. GABRIC: Same objection. I --

THE WITNESS: When I went through the paper, I would have -- they would have seen -- the presentation, they would have seen table 1; and then on the rest of the presentation, it would have been talking about

adding one pounds to four pounds.
BY MR. MC MILLAN:
Q. Right, which is not a real-world amount, is it?
A. It's the amount we chose to add.
Q. Right. It is higher than the real-world amount; right?
A. It's the amount we chose to add.
Q. You consciously made a decision to introduce a higher amount than you'd find in the real world; right?
A. I consciously added an amount that we believed would give us a response.
Q. Well, let me show you what's marked as Exhibit 316.
Would you read into the record that top paragraph.
MR. GABRIC: Hold on, David.
BY MR. MC MILLAN:
Q. Can you read into the record that top paragraph, Dr. Peele?
MR. GABRIC: Okay, I'm with you.
THE WITNESS: "In 1998 we modified two of our eight rack of tobacco barns

to burn propane gas (75,000 Btu's per hour). All tests were comparisons of propane versus electric. On published emissions data for combustion and propane, we calculated that the tobacco was exposed to approximately one pound of NOX during the entire 160-hour cure. We elected to expose the tobacco to a higher concentration" --

THE REPORTER: We elected to?

THE WITNESS: "We elected to expose the tobacco to a higher concentration."

BY MR. MC MILLAN:

Q. Let's just stop right there. Is that an accurate statement?

A. Yes, that's an accurate statement. We elected to expose the tobacco to a higher concentration.

Q. Is this a document you prepared?

A. I cannot tell from this whether I did because it was done on computer.

Q. Okay. In any of the 25 or 30 times that you gave this presentation, Dr. Peele, did you ever tell anyone in -- in the public or in your audience that whereas direct-fired cures generally result in higher

NNK values, your experiment resulted in just the opposite?

MR. GABRIC: Object to the form of the question.

THE WITNESS: In all the presentations we've made, we only talked about total tobacco-specific nitrosamines.

THE REPORTER: Sorry, total?

THE WITNESS: Total specific -- total tobacco-specific nitrosamines.

BY MR. MC MILLAN:

Q. All right. And in any of the experiments -- in any of the 25 or 30 occasions, did you report on some of the tests in which, instead of the results that you reported in your paper, you got TSNA values for your control barns of 2.3 TSNAs or 3.1 TSNAs or 2 TSNAs or 3.2 TSNAs? Did you ever report that data to anyone?

A. Just say that one more time.

Q. Did you ever report to anyone that in one of your NOX tests, your TSNA data ranged between 2 and 3.2 parts per million?

MR. GABRIC: Object to the form of the question.

THE WITNESS: We presented the data that was in the presentation.

BY MR. MC MILLAN:

Q. And it -- but the data I just referred to was excluded from the presentation, wasn't it?

A. Well, the data you -- which -- I don't know which experiment you're talking about.

Q. I'm talking about the NOX test 2.

A. We never reported NOX test 2 in the data that we prepared, as best I can tell from the data that's in front of me.

Q. Okay. Well, in -- in view of the fact that you conducted tests which in your control barns had TSNA results that ranged all the way from non-detect at 3.2, and in view of the fact that you had these strange NNN results, did you ever consider that you perhaps ought to go out and do some further tests --

MR. GABRIC: Object to form.

BY MR. MC MILLAN:

Q. -- to evaluate whether this NOX theory was really a correct theory or was just really another mistake?

MR. GABRIC: Object to the form of the question, argumentative, compound.

THE WITNESS: Rephrase your question, please.

BY MR. MC MILLAN:

Q. Given the fact that your NNN data was so out of line, that some of your test results were so out of line, did you ever think that it would be appropriate scientific behavior to do some additional tests to determine whether your NOX theory was correct or, like some of the other theories, incorrect?

MR. GABRIC: Same objection; argumentative, mischaracterizes the record, compound. There's a whole bunch of other things wrong with it, but I can stop there.

If you understand the question --

THE WITNESS: I don't understand the question.

BY MR. MC MILLAN:

Q. What don't you understand about it?

MR. GABRIC: Objection; argumentative.

THE WITNESS: Break it down in specific questions without asking --

BY MR. MC MILLAN:

Q. Okay.

A. -- two or three questions at a one time.

Q. You're a scientist; right?

A. Yes.

Q. And -- and as a scientist, you try to do tests that conform to the real world as much as possible; right?

MR. GABRIC: Objection; vague.

THE WITNESS: You don't have -- if you're a scientist, you don't have to perform tests that conform to real-world conditions.

BY MR. MC MILLAN:

Q. And as a scientist, when you see inconsistencies or data results that look strange to you, you're supposed to follow up and do some additional tests, aren't you?

A. We did a series of tests all during 1998.

Q. Right. And your series of tests showed that your electric control barns were

all over the lot?

MR. GABRIC: Object to form.

BY MR. MC MILLAN:

Q. Right?

MR. GABRIC: Object to the form of the question.

THE WITNESS: Define "all over the lot."

BY MR. MC MILLAN:

Q. Zero or non-detect at the bottom and 3.2 at the top. Would you think of that as all over the lot?

A. At our understanding of TSNA formation at that particular time, that was well within what we believed our objective was to have a 90 percent reduction in TSNA formation.

THE VIDEOGRAPHER: Mr. McMillan, I'm about to run out of videotape.

MR. MC MILLAN: Okay. We'll --

THE VIDEOGRAPHER: End of videotape No. 4, off the record at 5:33.

(Recess taken from 5:33 to 5:55.)

(Peele Exhibits Nos. 320 to 330 were marked for identification November 14, 2002.)

THE VIDEOGRAPHER: Beginning of videotape No. 5, back on the record at 5:55.

BY MR. MC MILLAN:

Q. Dr. Peele, are you familiar with the design of what I'll call the old barrel-style heat exchangers?

A. No, sir, not by that terminology.

Q. What -- what terminology do you use?

A. I don't know what fuel source a barrel-size heat exchanger is, so I don't --

Q. The old diesel heat exchangers.

A. Familiar in the fact that I have seen them because I've seen, you know, the diesel fuel leaking on the bottom. I've never examined one until we started the barn conversion process.

Q. Okay. But -- but you've -- as you sit here today, you've examined them?

A. As part of the barn-burning process, I saw some diesel ones that had been

taken out.

Q. Right.

A. And were sitting in the woods.

Q. And generally speaking, the designs of those diesel-fired heat exchangers was considerably different from the designs of any the heat exchangers that have been installed in retrofitted barns; correct?

MR. GABRIC: Object to the form of the question, vague.

THE WITNESS: I don't recall the specifics of the -- of the internals of the direct fire. I remember seeing the outside of the thing sitting in the woods.

BY MR. MC MILLAN:

Q. So as you sit here today, you're saying you don't -- you're -- you're not able to compare, make any comparison, between the performance of the new retrofitted heat exchange designs versus the old diesel-fired heat exchange designs?

A. Performance as defined as?

Q. Anything.

MR. GABRIC: Object to the form of the question.

BY MR. MC MILLAN:

Q. Have you ever attempted to make a -- a comparison between the way an old barrel-style, barrel by -- I'm just talking shape of the drum; it's a drum inside. Is that what you've seen in these diesel-fired units?

A. From the outside, it appeared to be a drum.

Q. Okay. Well, I'm -- I'm referring to that drum as a barrel.

A. All right.

Q. Okay? Have you ever made an effort to compare the performance of one of those barrel-styled heat exchangers with one of the new heat exchangers?

A. There were samples collected in 1998 from, quote, diesel barns; but at that time I did not know what the configuration of the heat exchanger was.

Q. Okay. Well, have you ever attempted to make any comparisons, for example, of the effect on airflow of using one of the old designs versus one of the new designs?

A. Again, you're referring to the

barrel?

Q. Yes.

A. Airflow of the barrel versus -- in what time frame?

Q. Any time frame.

A. Airflows were measured, and I would have seen some data, but I didn't conduct the experiments -- or I didn't conduct the measurements.

Q. Airflow was measured in what? What are you talking about?

A. The velocity of air through an orifice.

Q. You're saying that Reynolds has conducted some tests of the old barrel-style designs and tried to compare them with the new designs from an airflow perspective?

A. Again, I can't tell you if it was the old barrel type or not.

Q. So as you sit here today, you're not able to tell me what the --

A. I couldn't tell you any of the data because I wouldn't -- I don't recall any of that, and I don't recall the specifics of the -- of the -- of the test.

Q. Okay. Well, you do know from an engineering perspective or you would expect from an engineering perspective that the new designs would deliver greater airflow than the old barrel-type designs, all other things being equal?

MR. GABRIC: Object to the form of the question, vague, lack of foundation.

THE WITNESS: Repeat it for me --

MR. MC MILLAN: Do you know --

THE WITNESS: -- or rephrase it.

BY MR. MC MILLAN:

Q. Do you not know, Dr. Peele, that the new designs, just from an engineering standpoint, are designed to deliver greater airflow than the old barrel designs --

MR. GABRIC: Object.

BY MR. MC MILLAN:

Q. -- all other things being equal?

MR. GABRIC: Objection; lack of foundation, vague, compound.

THE WITNESS: And I don't know.

BY MR. MC MILLAN:

Q. Well, the fact of the matter is you specifically set out to find a design that would deliver more airflow; right?

MR. GABRIC: Objection; form of the question, it's vague.

THE WITNESS: It is my belief that we set out to find a -- if you use the term airflow as what a fan with a certain size horsepower on a fan performance curve will deliver that will be comparable to what is normally in the tobacco barn.

BY MR. MC MILLAN:

Q. Yes. But there are different resistances that a fan confronts in a tobacco barn; correct?

A. That's correct.

Q. And the resistance that one of these old barrel designs presents is quite a bit different from the resistance that one of these new designs presents; correct?

MR. GABRIC: Object to the form of the question, lack of foundation.

THE WITNESS: I don't know that.

BY MR. MC MILLAN:

Q. You don't know that, okay.

Well, is it true that there came a time, Dr. Peele, when you decided you needed to conduct an in-house engineering evaluation to see whether Reynolds could come up with a better heat exchange design than existed in the art?

A. I did not come up with that. There were engineers within RJR who believed that they could do that, but it was not me.

Q. Right. But the reason those engineers came up with that was because you asked them to come up with that; right?

A. No. When it was -- when we discussed it in Winston-Salem, there were other people involved in the process who wanted to see whether or not Reynolds could make a heat exchanger.

Q. Right. And the reason they wanted to make a heat exchanger was so that they could get a heat exchanger that had higher performance in terms of things such as better airflow?

MR. GABRIC: Object to the form.

BY MR. MC MILLAN:
Q. Right?
MR. GABRIC: Object to the form of the question, vague, compound, lack of foundation.
THE WITNESS: Rephrase it, please.
BY MR. MC MILLAN:
Q. Who were these people? Let's put some names to them.
A. I don't specifically recall the names of the engineers who were given the task of -- of looking at that.
Q. Who gave them the task?
A. Someone other than me because it wasn't me.
Q. So you don't know who did it --
A. I don't know who did it.
Q. -- who gave them the task, all you know is that they reported back to you on their results?
A. That's correct.
Q. And -- and they were asked to come up with a heat exchanger that would deliver 18,000 cubic feet per minute of air;

right?

A. I don't recall that number.

Q. Well, do you recall sitting down in conversations with these people, whose names you can't remember, and saying in words or substance, you know, "Look, these old barrel designs, I don't think they're up to the task"?

MR. GABRIC: Object to the form of the question, vague, assumes facts not --

BY MR. MC MILLAN:

Q. Do you remember any discussion like that?

MR. GABRIC: Same objection, assumes facts not in evidence.

THE WITNESS: I don't recall any conversations like that.

BY MR. MC MILLAN:

Q. Do you ever recall proposing some barn design to Swedish Match?

A. May I see the document?

Q. Sure. Exhibit 320, the memo from you to Dwayne Beeson of March 29, 2001.

A. The topic of conversation that this memo refers to is trying to mimic or simulate air curing in a flue-cured barn on

burly tobacco.

Q. Okay. Let me show you -- let's see here. We need one other -- well, we will just keep it this way, I guess.

I'm going to give you a series of documents here, Dr. Peele. They all involve Mr. -- well, except the last one. The first four involve someone named David Newsome.

Is he the person that you interfaced with on the new heat exchanger design?

A. David Newsome? May I see the documents?

Q. Sure. Exhibit 321, now this may be two different documents. The first is an e-mail from you to Mr. Newsome of November 24, '98. The second is something that was sent to you on November 24th, '98.

322 is a memorandum of December 8th, '98, directed from Mr. Newsome to Mr. Flinchum.

Exhibit 323 is December 8th, '98, from Mr. -- see if that's the same one -- is that the same one that I'm marking twice?

No. I think I just -- 323, that is.

And 324 is December 8th from Newsome to Flinchum.

325 is December 7th from Peele to various people.

MR. GABRIC: May I have copies?

MR. MC MILLAN: Yeah.

MR. GABRIC: Thank you.

BY MR. MC MILLAN:

Q. Let's start with the first one, the Peele to Newsome. Do you have that one in front of you?

A. Is that Exhibit 321?

Q. 321.

"David," you say, "Glad you agreed that 18,000 CFM looks impossible on this fan curve." Going down a little further, there's something that says, "Using his number about" 3 -- 11 -- "about 11,000 CFM is required."

Does this refresh your recollection that there came a point in time, Dr. Peele, when you tried to evaluate what might be needed in the real world in terms of heat exchange design?

A. I see the documents, but I -- I can't back-calculate where the 18,000 CFM comes from.

Q. Is there someone within Reynolds that either works with you or that you know of that you believe is an expert in heat exchange designs?

A. No, sir.

Q. Do you know of anyone within Reynolds who has attempted to make an effort to compare the respects in which the new heat exchanger designs exceed earlier versions?

A. Exceed the earlier versions in what respect?

Q. Well, for instance, in the ability to deliver air or deliver heat.

A. Anyone within Reynolds?

Q. Yes.

A. And for -- if you will repeat the question just one more time or have the recorder repeat the question so I know what you're asking.

Q. Okay. My question is this: I'm going to change the question on you. That's a trick of the lawyers.

MR. GABRIC: Seen that a few times today.

BY MR. MC MILLAN:

Q. If we come to trial in this case and put on evidence that says, you know, these new heat exchangers, they're quite a bit different from what existed, they're designed to operate quite a bit differently, do you have the expertise and knowledge to respond to that?

MR. GABRIC: Object to the form of the question, calls for speculation. The question is vague, ambiguous, compound.

And I will note for the record that this is the last question. The deposition has exceeded seven hours.

THE WITNESS: And my answer is I don't know.

BY MR. MC MILLAN:

Q. And why is it that you don't know?

MR. GABRIC: We're -- we're done. This deposition is over, Mr. McMillan. We have gone past the seven hours, and I've been kicked out of depositions for going past seven hours, so we're done.

STATE OF ILLINOIS)
) SS.
COUNTY OF DE KALB)

I, Linda D. Hansen, CSR, RDR, CRR, a notary public in and for the County of DeKalb and State of Illinois, do hereby certify that the witness was by me first duly sworn to testify to the truth, the whole truth, and nothing but the truth, and that the preceding deposition was recorded stenographically by me and reduced to typewriting by computer transcription.

I FURTHER CERTIFY that the foregoing transcript is a true and correct transcript of the testimony given by the said witness at the time and place specified hereinbefore.

I FURTHER CERTIFY that I am not a relative or employee or attorney or counsel of any of the parties, nor a relative or employee of such attorney or counsel, nor financially interested directly or indirectly in this action.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal this _____ day of _____, 2002.

_____
Linda D. Hansen, C.S.R. No. 84-3027

STAR SCIENTIFIC, INC.,

Plaintiff,

vs.

R.J. REYNOLDS TOBACCO COMPANY,

Defendant.

I, DAVID PEELE, hereby certify that I have read the foregoing transcript of my deposition taken on Thursday, November 14, 2002, consisting of pages 1 to 267, and that to the best of my knowledge it is a true and correct transcript of said deposition, except as I have changed it on the attached sheets in accordance with the rules provided by the said court.

DAVID PEELE

No errata sheets submitted (Please initial)____

Number of errata sheets submitted 1 (pgs.)

SUBSCRIBED AND SWORN TO

before me this 31 day of December, 2002.

Notary Public

6/24/2003

ERRATA SHEET

N RE: STAR SCIENTIFIC, INC. vs. R.J. REYNOLDS TOBACCO COMPANY, CASE NO. AW01-CV1504 AND AW 02 CV 2504
DEPOSITION OF: David Peele
DATE OF DEPOSITION: November 14, 2002

At the time the above named deponent and signed this disposition, the deponent desired to make the following changes:

PAGE	LINE	AS TRANSCRIBED	CHANGED TO	REASON FOR CHANGES
7	11	total	toll	wrong word
11	9	of what has turned into trade yellowing	of what is termed in the trade yellowing	inadvertently transcribed
33	22	are and what -- what the date it was in order	are and what the data is in order	inadvertently transcribed
191	9	copy of Exhibit 296 was not in documents I received		
217	13	Ari	Ira	inadvertently transcribed
220	3	red	rack	wrong word
233	19	26 is a four-rack electric barn	26 is a sixteen rack electric barn	wrong word

Clarification Issues

217	5,6	tobacco in one electric barn, two propane barns, two direct-fired that we'd converted	tobacco in one electric barn, two direct-fired propane barns that were converted from electric barns
236	12-14		Grab samples from NOX Test 1
238	23	in the cylinder, it was pure NO	in the cylinder, it was 99.5% NO

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MARYLAND
SOUTHERN DIVISION
CASE NO. AW 01-CV-1504
CASE NO. AW 02-CV-2504

----------X

STAR SCIENTIFIC, INC., :
Plaintiff, :
Vs. :
R.J. REYNOLDS TOBACCO :
COMPANY, :
Defendant. :

----------X

ORIGINAL

Deposition of TIM NESTOR
(Taken by the Plaintiff)
Chicago, Illinois
August 29th, 2002

Reported by: Susan Babicki, CSR No. 084-003956

others did in connection with this comparison of domestic versus overseas.

A. Basically my role would have been to determine what tobaccos that I would want to test, determine what tobaccos were available, and obtain those tobaccos from our inventories, submit them for whatever chemical and/or smoke analysis that I may want and then submit them to the lab for those analyses.

Q. Okay. Let's go forward in time then to the 1998 time frame.

What activities were you involved in relating to TSNA in 1998?

A. In '98, particularly late in '98, my direct role probably increased more as I was responsible for the gathering of a number of samples in which we were trying to look at the differences between direct fire and heat exchange tobaccos that were flue-cured tobaccos.

Q. Was that the primary TSNA activity you had in 1998 that you were involved in?

A. I was involved in some of the other experiments in a cursory role, some of the fan cycling, packing density experiments, the CO2 measurements and things of that nature.

responsible for the daily activity in terms of the experiments, and Dr. Peele would have been basically overseeing those experiments.

Q. In 1998 or for that matter for the years leading up to '98, Mr. Nestor, did you ever reach a personal conclusion as to what causes the formation of TSNAs in flue-cured tobacco?

A. I had read in the literature about what the hypothesis for nitrosamine formation was, and I had no other reason to believe there was anything else besides that at the time.

Q. When did you first learn or when were you first told there might well be something or somebody believed there might well be something other than that hypothesis at work?

A. When Dr. Peele brought it to other people's attention, to my attention that he may -- he thought he might have come across something.

Q. Was that in either May or June of 1998?

A. I'm not exactly sure of the time frame.

Q. Was it in 1998 sometime?

A. I believe so.

Q. Okay. Now, let's go forward in time again, and then we'll come back and get into a little more detail.

But in 1999 what role did you have in TSNA research?

A. I was involved in the pilot program in which we were trying to demonstrate the commercial feasibility to converting direct fire barns to heat exchangers.

My role involved the data analysis and compiling that data so that comparisons could be made.

Q. You also had a role in coordination of the fire barn activities, did you not?

A. I was aware of the farm activities, but I really didn't have any coordination role in that regard. That primarily fell within the Avoca personnel.

MR. McMILLAN: Let's mark this as Exhibit 209.

(Nestor Exhibit No. 209 was marked for identification.)

BY MR. McMILLAN:

Q. Mr. Nestor, I'm showing you a copy of an E-mail from Jeff Gentry dated March 29th, 2000. It's addressed to David Doolittle.

Who is David Doolittle?

MS. VITELLARO: Objection. I think

chemistry collection, and coordination with your staff."

Does that refresh your recollection that you had some responsibility for, quote, all farm coordination?

A. The farm coordination that's referenced here refers to the coordination of obtaining tobaccos from those farms to be brought to Winston Salem so that we could conduct our analysis.

Q. So you did have a responsibility for that?

A. For that particular aspect, yes.

Q. What other involvement did you have in 1999 other than the pilot project, anything?

A. I also conducted some NOX experiments during the '99 time frame.

Q. When you say you conducted the NOX experiments, what do you mean?

A. I looked at different alkaloids and their interactions with NOX in a nontobacco medium.

Q. When you say you looked at it, do you mean you personally?

A. Correct.

Q. So you were actually the technician, so to speak?

A. I was hands on, if that's what you mean.

Q. Right. Now, do you have a chemistry background?

A. No, I do not.

Q. These were primarily chemical or chemist-type tests, though, weren't they?

A. They're scientific tests.

Q. What background or experience did you have that qualified you for doing these sorts of tests?

A. Again, I have a scientific background, and I am aware of scientific procedures.

Q. Exactly what NOX test did you conduct?

A. Again, taking a nontobacco medium and looking at what occurred when you exposed various tobacco alkaloids to NOX gas.

Q. So in 1999 then, you were responsible for the coordination of the pilot program and you were also involved in doing some NOX testing.

Anything else related to TSNAs?

A. Not that I can remember.

Q. Well, let's bring ourselves up-to-date.

In the 2000-2001 and 2002 time frame, what responsibilities have you had in this area?

Q. And who is the head of the brands department?
A. Skip Tinsley is the head of brands.
Q. Skip Tinsley?
A. Correct.
Q. Who does he report to?
A. Dave Townsend.
Q. Mr. Nestor, let me show you a copy of the article that was, I believe, published for the first time in approximately September of 1999.
It was previously marked as Gentry Deposition Exhibit 30(b)6 No. 67, and it's entitled, "Formation of tobacco specific nitrosamines in flue-cured tobacco."
Are you familiar with this article?
A. Yes.
Q. You're listed as a coauthor of the article; is that right?
A. Correct.
Q. What -- can you tell me what was your contribution to this article?
And if you can, point out to me the specific paragraphs or charts or whatever that you were actively involved in or had some responsibility for?

MS. VITELLARO: I'm going to object as vague.

BY MR. McMILLAN:

Q. That's just an objection for the record. Go ahead.

A. Could you be more specific?

Q. No. I'd like to know what parts of this article you had some responsibility for.

A. My role in putting together this article were, one, as a reviewer and then, secondly, as I basically took the text and created the graphs and embedded the graphs within the -- and tables within the document.

Q. Okay. Now, some of these graphs and tables contained information that you would have been responsible for developing; is that right?

A. That I was either provided or had generated from raw data that had been provided to me.

Q. And which of these charts or graphs were you responsible for developing?

A. I put all of the tables and charts together for embedding into the manuscript.

Q. All right. And let's start with table 3, Mr. Nestor.

Where did you develop the data that was put into table 3? Sorry. It's on the second to last page or third to last page. Sorry.

A. Table 3 labeled as the, "TSNA sampling from the various commercial producing barns"?

Q. Right.

A. That data came from our 1998 sampling.

Q. What 1998 sampling are you talking about?

A. In which flue-cured tobaccos were sampled from various heat exchange and direct fire barns.

Q. How did you go about selecting the heat exchange barns that you were going to sample in 1998?

MS. VITELLARO: Objection, foundation.

THE WITNESS: Could you repeat the question?

BY MR. McMILLAN:

Q. How did you go about selecting the heat exchange barns that you were going to sample in 1998?

A. They were just a random selection.

Q. And why did you do that on a random basis?

A. Again, the main criteria was heat exchange versus direct fire.

Q. Okay. Were you trying to get some sort of a representative group of heat exchange samples so that you could compare it to direct fire?

A. I don't understand your question.

Q. What about my question do you not understand?

A. What do you mean by "a representative sample of heat exchange samples"?

Q. I mean, did you attempt to obtain samples from heat exchanges that you thought would be reasonably representative of what you'd likely find out there in the world in sampling heat exchangers for TSNAs?

A. We attempted to find as many different types of heat exchangers as we could during the time frame that we were doing this study.

Q. Now, let me see if I can -- there's a reference in table 3 to the fact that there were 27 samples for bulk diesel.

Do you see that?

A. Yes.

Q. And then there were also 23 samples obtained from Turkey; is that right?

A. Correct.

Q. Now, is the Turkey -- were the samples obtained from Turkey, was that obtained in the '97 time frame or was that in '98 also?

A. I'm not sure when those would have been obtained.

MR. McMILLAN: Just give me one minute here, please. Let me mark these as 210 and 211, please.

(Nestor Exhibit Nos. 210-212 were marked for identification.)

MS. VITELLARO: Is this 210?

MR. McMILLAN: That's 210. This is 211. This is 212.

BY MR. McMILLAN:

Q. Mr. Nestor, I'm going to show you four documents here just to speed this along a little bit.

Let me identify them for the record, and then I'll pass them over to you. Now, the first Exhibit 210 is -- has two E-mails up at the top. One is from David Peele to you and others dated March 24th, '99, and the original message is from you to Dr. Gentry, Dr. Peele, and Gary Shelar.

A. Shelar.

Q. Shelar. Exhibit 211 is something entitled, "Nitrosamine summary." Exhibit 212 are some answers to an interrogatory that R.J. Reynolds provided to us in this lawsuit.

And exhibit -- the last exhibit is previously marked as Exhibit 190 in the Brown deposition. I'll pass those over to you.

MS. VITELLARO: Is there another copy of 190?

MR. McMILLAN: Yes. Sorry.

BY MR. McMILLAN:

Q. First of all, just to get sort of coordinated here, Exhibit 210 makes reference to an attached file that's a compilation of our nitrosamine data.

It says, "I have listed typical TSNA ranges by tobacco type and also listed expanded range which is meant to illustrate other possible measurements."

Do you remember that E-mail?

A. I'd have to see the E-mail, the attachment maybe to know.

Q. Okay. Well, look at Exhibit 211. Tell me whether that is either the attachment or has the same data that you recalled would have been in the

attachment to your E-mail.

A. I believe it is, yes.

Q. Now, in the attachment 211, which is entitled "Nitrosamine summary," you have a typical range and an expanded range.

Let's -- first of all, tell us what you meant by those two titles?

A. "Typical range" would mean that you would typically see this sort of result with any of the various tobacco types listed here.

And "expanded range" would be that occasionally you would see results of this type, but on a more consistent basis it would fall within the typical range.

Q. What do you mean by "typical"?

A. That if you were to go out and conduct a measurement within our laboratory on this particular tobacco type that your result would most likely fall within the typical range.

Q. Okay. Now, your typical range for heat exchange flue-cured is one to two parts per million; is that right?

A. Yes. That's listed here.

Q. How did you derive that number?

A. I don't remember exactly how that

number was obtained.

Q. The expanded range for heat exchanged flue cured is .5 to 2.5 parts per million.

Do you remember how you arrived at that number?

MS. VITELLARO: Objection, foundation.

THE WITNESS: All of these numbers would have been arrived based upon data that had been generated.

BY MR. McMILLAN:

Q. But you were the person that collected that data and drew these conclusions, correct?

A. Either data that I generated or data that others would have generated.

Q. So in other words, you either took data you had generated yourself or others had generated and drew the conclusions reflected here?

A. Again, this is for numbers that would be -- would have been typical or expanded within our laboratory, yes.

Q. And by "within your laboratory," you mean you got samples from outside in the real world and measured them in your laboratory?

A. The analysis within our laboratory, correct.

Q. Now, in the article that was published in September of 1999, the table 3 bulk diesel heat exchange number is one part per million, correct?

Go back to that. Sorry. Go back to table 3 that we were looking at before.

A. Okay.

Q. And first of all, a bulk diesel heat exchange, what we're referring to here, I take it, or what you're referring to is an oil-fired heat exchanger, barns that are equipped with an oil-fired heat exchanger?

A. In terms of the bulk diesel?

Q. Yes.

A. That's correct.

Q. And the number there is 1.0.

Can you tell me what's the relationship, if any, between the conclusions stated in this paper that oil-fired heat exchangers have TSNAs of one part per million and the conclusion in your Exhibit 211 that heat exchangers have a typical range of one to two parts per million?

MS. VITELLARO: Objection, foundation.

THE WITNESS: The data listed here in terms of one part per million for the bulk diesels

are the average of the 27 samples.

BY MR. McMILLAN:

Q. Okay. And what is -- how does that compare with the one to two part per million in the Exhibit 211?

A. Well, the only thing I can say is it fell within that range.

Q. So the one part per million was the average of 27 samples?

A. Correct.

Q. And are the 27 samples that were averaged -- if you'll go now to Exhibit 212.

First of all, have you seen Exhibit 212 before? You know, actually I think I misidentified -- I think the article -- I have to do a little correction for the record, Mr. Nestor.

The article -- your article of September of '99, I think I said it was Gentry Deposition Exhibit 67. Well, maybe it was. Well, maybe it was 67. I thought maybe it was marked as a different number. Forget all that. Let's go back -- let me start over.

Look at Exhibit 212, please. And 212 is an interrogatory that was asking R.J. Reynolds to tell us the identity or identify for us the

the 27 samples had formed the basis for -- well, let's -- let me start over.

We're referring now to the data that got incorporated into your article in September 1999 that included, among other things, that based on 27 heat exchange samples the TSNA value, average value for those samples was one part per million?

MS. VITELLARO: Objection, foundation.

BY MR. McMILLAN:

Q. Right?

A. Could you repeat that again?

Q. You wrote an article in September of 1999 with others, correct?

A. I did not write that article. I reviewed that article and was a coauthor in that article.

Q. You were a coauthor of an article that was presented in September of '99, right?

A. Correct.

Q. And you reviewed that article and you provided certain input into that article, correct?

A. Correct.

Q. One of the inputs you provided was a chart that's labeled table 3, correct?

A. I generated a chart, correct.
Q. And one of the conclusions of that chart is that from a field of 27 oil-fired heat exchange samples that Reynolds took you concluded that the average TSNA value was one part per million, correct?
A. The 27 diesel heat exchange samples average was one part per million?
Q. Right.
A. Correct.
Q. Right. And that reflected efforts that you had made to collect heat exchangers from a -- excuse me -- to collect samples from a variety of different diesel-fired heat exchange barns and analyze those samples to determine the TSNA values, correct?
A. Decisions that I had made?
Q. Not decisions. Actions that you had taken.
A. As a group. I was involved in a group activity.
Q. Right. So you, as part of this group activity, were responsible for collecting these 27 samples from a variety of different barns?
A. Yes, I was involved in that activity.

Q. All right. And you oversaw in some way the analysis of those samples to determine what the average TSNA value is for diesel-fired heat exchange products, correct?

A. Well, I provided the samples for analysis.

Q. And you -- did you reach a conclusion, Mr. Nestor, that the -- that one part per million was a reasonable value to put into this article?

A. The data speaks for itself.

Q. So --

A. It's --

Q. The data is accurate?

A. The one part per million listed in table 4 of this document is reflective of the 27 samples that are also listed in table 4 of this document.

Q. And just so we avoid any confusion, table 4 of the draft of the article, Exhibit 61, is based on the same data as table 3 of the final article? I think we just agreed on that a moment ago.

You're looking at the draft article. If you'd just pull out the final article. Look at table 3.

That's the same data, right?

A. Correct.

Q. So let's now go through the different sample numbers that are listed in the interrogatory response. Strike -- let me slow down a little bit.

After we received a copy of your article in this draft and when we were taking -- after we took Dr. Gentry's deposition, are you aware that we asked Reynolds to specifically identify for us the 27 oil-fired samples that are the basis for this article?

A. I was asked to provide some information to counsel.

Q. Did you understand that was an order to respond to a question we had asked or an interrogatory that we had asked?

A. Yes.

Q. So as best you know, the information in this interrogatory response came from you; is that right?

A. In this particular part of the interrogatory?

Q. Yes.

MS. VITELLARO: Objection, foundation.

THE WITNESS: I don't know.

BY MR. McMILLAN:

Q. Well, there's list of -- the question that was asked here was: "For each of the 27 heat exchanger samples reflected in table 4 of Gentry Deposition Exhibit 61," which is the draft that you're looking at right there, for each of those 27 diesel heat exchange samples provide certain information such as the date the sample was collected, et cetera, okay?

A. Okay.

Q. All right. The first sample that's listed is Exhibit 157A. And now I want you to go to Exhibit 190, which you have right there in front of you. That's the collection of Reynolds data that has a little more detail to it than this interrogatory response.

Exhibit 157A appears to refer to a sample taken from Hassel Brown farm on October 7th, 1998.

Was that one of the samples that was included in the 27?

A. It may have been. I don't know this document well enough to be able to answer that question.

Q. Well, I've gone ahead on my own copy

here and highlighted just for myself the different samples that correspond to the interrogatory response.

And I see under the names -- under the heading of -- let's see what it's called -- the TOB source -- does that stand for tobacco source?

A. I don't know. I didn't make this.

Q. Have you ever seen data like this?

A. Have I ever seen data like this?

Q. Well, isn't it true, Mr. Nestor, that if you went into the computer systems, your own databases at Reynolds, and tried to look up sample 157, you would get, among other things, exactly this type of information?

MS. VITELLARO: Objection, foundation.

THE WITNESS: No, that's not correct.

BY MR. McMILLAN:

Q. It's not correct. And what sort of information would you get?

A. I don't have the ability to look up sample 157A.

MS. VITELLARO: I'd like to point out that the response to -- the amended response to an R.J.R. document with a Bates number, and I'm not quite sure it's the same as this because this has

A. Seven pages in. Repeat the question, please.

Q. You see the sample -- in the middle of the page, there's a series of Hassel Brown samples starting with sample 238A and going to 240 -- actually -- well, 249A, and nine of those samples are listed as diesel.

Do you see that?

A. Yes.

Q. Is there a reason that those samples were not included in the 27?

A. I have no idea how these samples were utilized.

Q. When it came time to pulling together the data that was going to actually go into in article in table 3 and deciding what heat exchange samples were going to be utilized to come up with the TSNA number that you were going to put into the table, first of all, who did that? Was that you?

A. No.

Q. Who did it?

A. I don't know that there would be any one individual that I would know that did that.

Q. All right. Well, how was it done?

A. Again, I don't know.

Q. Well, how was the data provided to you? I thought you were the person who was responsible for going out and getting these samples and having them analyzed?

A. Again, I provided the samples to the lab. And then after the lab had been -- had completed the sample analysis, I took the data.

Q. But you chose to create a certain table out of the data, correct?

A. I chose to do what?

Q. Create a table out of the data.

A. I just reported the data.

Q. Well, you put together the table 3 that's in your article, right?

Didn't we talk about that earlier?

A. I generated on the computer table 3 that was put together.

Q. Right. And where did you get the data that you used for that?

A. That data would have been generated at our lab.

Q. But who decided what data to use in the table that you put together?

A. I don't know specifically who would have decided that.

Q. Well, who might have decided it?
A. I would have to speculate.
Q. Okay. What's your speculation?
A. It would have been someone involved in the project.
Q. So you're saying here, Mr. Nestor, that in this table that you put together for your article in which has been published and republished numerous times that you don't have any knowledge as to what person put this data together?
A. No. What I'm telling you is I know that there was a -- samples that were collected that went into this table.
Q. Right.
A. And those specific samples, that data is reported in this table.
Q. Right. But it was your responsibility to go out as part of a group and collect the samples, right?
A. Correct.
Q. It was your responsibility to go make sure they got analyzed, right?
A. Correct.
Q. It was your responsibility to take those analyses and put them into the table, right?

A. A summary of just combined the analysis?

Q. Right.

A. Correct.

Q. Did anyone else have any significant input in generating the table that's shown as Exhibit 3 in your article?

A. Well, the table was just generated by the numbers that were provided from the lab.

Q. And did anybody have any -- anyone other than you have any significant role in deciding which numbers from the lab to use for purposes of generating the table?

A. Again, all numbers for the samples that were provided within the study were utilized, to my knowledge.

Q. Do you remember some of the different types of heat exchangers that were analyzed as part of these 27 samples?

A. Uh-huh.

Q. How many different types of heat exchangers were there?

A. Oh, I'm not sure exactly how many.

Q. Approximately.

A. To my knowledge, there would have been

three different fuel sources that were evaluated in a heat exchanger system.

Q. Well, we're talking -- I'm talking about the diesel or oil-fired heat exchangers that -- the 27 samples that we've been talking about.

A. Okay.

Q. How many different types of diesel or oil fired heat --

A. What do you mean by "types"? They're all oil or diesel so . . .

Q. Were they made by different manufacturers, for instance?

A. Oh, I don't know.

Q. Were you aware of any diesel or oil-fired heat exchanger that was in use in 1998 that was different from the ones you sampled in that time period, different in design?

A. I don't know.

Q. Mr. Nestor, let's take a look at figure 2 in your article. Just put that to one side.

A. Okay.

Q. Let's go back to your article. Let's look at figure 2. Figure 2 is entitled, "Dose

effect of NOX gas on TSNA."

Do you have that?

A. Yes.

Q. That's another of the charts that you generated?

A. Correct.

Q. And was this also data that you collected?

A. No.

Q. Was this data that was taken from some of the experiments you did?

A. This is not data from an experiment that I conducted.

Q. Where did the data for this chart come from?

A. This came from an experiment that was conducted at Avoca.

Q. Did you have any participation in that particular experiment?

A. What do you mean by "participation"?

Q. Well, you said earlier that you had done your own NOX work.

How, if at all, was the work you did related to the data that's set forth in figure 2?

A. I didn't have any hands-on involvement

with this particular experiment cited in figure 2.

Q. Did you have any hands-on involvement in the discussion of whether or not there was some dose effect that could be identified?

A. I was involved in the results discussions, if that's what you mean.

Q. What does "dose effect" mean?

A. "Dose effect" is implied here that for various amounts of NOX entered into the curing schedule there was a change in nitrosamine response.

Q. Okay. Did you ever have any discussions about what sort of dose-response relationship does or does not exist between NOX and TSNA?

A. I don't follow the question. I'm sorry.

Q. Well, this particular experiment that's at subject here involved two different -- the use of two different amounts of NOX gas, right?

A. Correct.

Q. 1.80 kilograms and .45 kilograms, right?

A. Correct.

Q. And then the two lines or graph there

show the TSNAs that formed when you introduced those two different amounts of NOX, correct?

A. Correct.

Q. Now, are you familiar with terminology like "a dose-response relationship that's linear," would that be --

A. Yes.

Q. Did you ever have any discussion as to whether the dose-response relationship between NOX and TSNAs was linear?

A. Yes.

Q. What, if any, conclusions were reached?

A. I don't know that there were any conclusions reached.

Q. Who participated in the discussions?

A. That would have been the working group.

Q. Who was the working group?

A. That would have been Dr. Gentry and Mr. Peele and Mr. Riddick that would have been involved in this experiment.

Q. So we've got Dr. Gentry, Dr. Peele, Mr. Riddick, and I think you said you participated in these discussions?

A. Correct.

Q. Were there any others?

A. I don't remember.
Q. Well, when you and Dr. Gentry and Dr. Peele and Mr. Riddick got together to discuss dose-response relationships between NOX and TSNA, did you have an opinion in that?
A. My only opinion is that for the two doses that were induced into the barns we saw two different levels of nitrosamines.
Q. So you didn't have an opinion as to whether or not it was linear?
A. No.
Q. Did anyone have an opinion as to whether or not it was linear?
A. I don't know.
Q. Did anyone express an opinion that it was not linear?
A. I don't know that either.
Q. Did anybody express an opinion that it was linear?
A. I think -- the discussion was to look at the shape of the database generated here. It was discussed, and the main conclusion was that there was a dose response.
Q. In your discussions with Dr. Peele and Dr. Gentry and Mr. Riddick, were there any

discussions about whether either 1.8 kilograms or .45 kilograms of NOX was a realistic amount of NOX to simulate a barn?

A. What do you mean by "realistic"?

Q. I mean, did it in some sensible or scientific or reasonable fashion simulate what you might find in the real world?

A. Well, the intent of this experiment was just to determine if there was indeed a response to NOX exposure and if that response was affected by the amount of NOX provided in each system.

Q. So you were trying to ask that question inside a laboratory somewhere, not ask it for purposes of finding out what happens in the real world of a barn?

A. This was in a barn.

Q. But it was not a commercial barn?

A. They were in research barns, correct.

Q. Right. Was an effort ever made to see what actually happens in a real world commercial barn?

A. What do you mean by "see what happens"?

Q. See what impact NOX does or doesn't have.

A. Well, the presence or absence of NOX by

the use of a heat exchanger or a direct fire, we would have been evaluating that as well.

Q. Once the work that was reflected in figure 2 was completed, what was the next NOX analysis or study that was done?

A. I don't know what would have came next. I don't remember off my head.

Q. Did the NOX work that you did precede the figure 2 work or did it come afterwards?

A. Well, as indicated by the figure 2, that this work was done with 1998 flue-cured tobacco. The work that I did was conducted in the summer of '99.

Q. The work that you did was conducted in the summer of '99 during the same time the pilot program was going on?

A. Correct.

Q. Okay. What work did you do in '99?

A. As I referred to earlier in the nontobacco medium, just looking at interaction of alkaloids and NOX gas.

Q. Tell us precisely what you did step by step. Pretend I'm a scientist, which I'm not.

A. Well, having worked in the field of tobacco for 12 years, obviously I'm aware of the

various alkaloids that are present in tobaccos.

I'm also aware of the scientific literature that refers to -- that these alkaloids being precursors for various individual nitrosamines.

Q. Okay.

A. So in the summer of '99 I conducted a study that looked at these individual alkaloids outside of the tobacco matrix and how they interacted with NOX in that regard.

Q. Okay. What specific alkaloids did you look at outside of the tobacco matrix?

A. Nicotine, nornicotine -- I'm trying to remember -- and anabasine, I believe.

Q. Did someone ask you to do this?

A. Yes.

Q. Who?

A. Dr. Gentry.

Q. Did he tell you why he wanted you to do it?

A. Fundamental research.

Q. What was your purpose in doing it?

A. I was asked to do it by Dr. Gentry.

Q. Were you trying to test a particular hypothesis?

A. We did not have a defined hypothesis going into the experiments, if that's what you're asking.

Q. Were you trying to determine a specific thing?

A. No. We pretty much knew at that time that -- the role in terms of -- NOX played in nitrosamine formation.

What we were doing at that point was to verify in the literature that these individual alkaloids also reacted as we anticipated.

Q. How did you anticipate they were going to react?

A. As far as the individual alkaloids of being precursors for particular nitrosamine formation.

Q. You anticipated that these particular alkaloids would be precursors and result in TSNA formation?

A. Well, the literature is very clear in that regard. It's the nitrosation of the tobacco alkaloid.

Q. Were you trying to do anything other than what the literature already demonstrated?

A. No.

Q. Okay. And what conclusions did you reach?

A. That the expected alkaloids did generate the expected nitrosamine when exposed to NOX gas.

Q. Did you evaluate that at different levels of NOX gas?

A. Yes.

Q. And what impact, if any, was there when you varied the levels?

A. I'd have to review that data to tell you for sure, but -- I can't really speculate on that, to tell you the truth.

Q. Tell us as precisely as you can exactly what you did.

A. We would take a filter pad, which is generally used to trap tar in general smoke analysis, and we would treat that pad with a solution that contained a tobacco alkaloid and then put this pad into a sealed bag in which you would be able to inject a known concentration of NOX gas, knowing the volume of air that you could fill this bag up and inject a known amount of NOX so that you had a concentration of NOX in there.

And then the pad would be analyzed

after a time frame exposure for nitrosamine content.

MR. McMILLAN: Let me take a short break.

THE VIDEOGRAPHER: End of videotape one. Off the record at 11:41.

(Recess.)

(Nestor Exhibit Nos. 213-217 were marked for identification.)

THE VIDEOGRAPHER: Beginning of videotape number two. Back on the record at 11:49.

BY MR. McMILLAN:

Q. Mr. Nestor, I'm going to show you a series of exhibits. I'll just identify them briefly for the record.

First is Exhibit 213 entitled, "Outline for TSNA presentation." Next is 214 entitled, "TSNA mechanism study." Next is 215 which are a series of notes which, I think, may be your handwriting, but I'll ask you that in a minute.

216 is another set of notes, may or may not be your handwriting. Exhibit 40 was previously marked at Mr. Gentry's deposition, and Exhibit 217 is a collection of data. The Bates stamp number is 525755893.

Let me just work off this for one second. We'll see if these are relevant to what we were just talking about or not.

First of all, just for the record, tell us if the handwriting on several of those exhibits is yours.

A. Exhibit 213 is my handwriting.

Q. Okay.

A. Exhibit 215 is my handwriting.

Q. Okay.

A. 216 appears to be my handwriting.

Q. Okay.

A. Gentry Exhibit 40 is not my handwriting.

Q. Okay. All right. Let me mark one other exhibit while we're at it. This would be 218, I think.

(Nestor Exhibit No. 218 was marked for identification.)

BY MR. McMILLAN:

Q. Mr. Nestor, showing you what's been marked as Exhibit 218, is that your handwriting?

A. No. No, it is not.

Q. Tell me whether any of the documents that I've just shown you starting with Exhibit 213

and continuing through the one you're holding there, 218, relate to the work that you did in 1999.

A. 213 is.

Q. Okay.

A. 214 is. 215 is. 216 is not.

Q. Okay. Just give me that back then.

A. Gentry Exhibit 40 is.

Q. Okay.

A. 217 is.

MS. VITELLARO: Do you have another copy of 218?

MR. McMILLAN: I do. Let me just find my original here.

THE WITNESS: 218 is.

BY MR. McMILLAN:

Q. Okay. Was part of the work that you were doing here an effort to determine the relative impact of NOX versus microbial activity?

A. No.

Q. On the first page of Exhibit 218 -- on the first page of Exhibit 218, Mr. Nestor, in the third bullet there, it says -- or the third line, it says, "Isolate chemical versus microbial."

Do you know what reference -- what

that's a reference to?

A. I did not write that. So I'm not exactly sure.

Q. Okay. Did any of your work deal with that topic?

A. I didn't do anything associated with microbial.

Q. Do you know whether anyone at Reynolds has?

A. I don't know.

Q. Just sticking with 218 since you have that in front of you, it says right below where we were looking, "Relevance of above to real world concentrations," and then you go down and there's some numbers above a double line.

And then right below that it says, "Need to further reduce to levels above double line."

A. I see that.

Q. Do you know what that's a reference to?

A. What what is in reference to?

Q. What I just read starting with "relevance of above to real world concentrations" and then everything that follows.

A. Yes.

Q. Can you explain that to us?
A. Well, basically the work that was started with the pads was done based off of the experiment that was cited earlier as far as the NOX were into the barns.
And the one to four pounds that is listed here in the document correlates to the two levels that were utilized in that experiment in the barns.
Q. The one to four pounds listed here correlates to the .45 and the 1.8?
A. KGs.
Q. KGs?
A. Those are equivalents. And then the translation below that is translated to weights of tobacco that are listed, .120 to .480.
Q. What is it? Micrograms, is that what that is?
What does "mg" stand for?
A. I'm not sure if that's micrograms or milligrams.
Q. Okay. And do you know why a conclusion is reached here that says, "Need to further reduce to levels above double line"?
A. Yes.

asked me that question, I forgot what I was looking for.

Q. You were looking for the results, if they're reflected anywhere in any of these documents, of this effort you just described of further reducing the levels to levels that more closely simulated barns.

A. Yes, I do.

Q. Okay. What are you referring to?

A. The second page of document 218.

Q. Okay. Tell us what's shown there. Explain that to us, please.

A. In the area that starts with "NOX per WT air concentration," underneath that you have different amounts, one microliter, five microliters down to 50 microliters of NOX.

Q. So that's what was done.

Is there any results shown anywhere? Can you find the results?

A. You asked me if there was a reference to it, and that is a reference to it.

Q. Right. Can you find in any of the other documents the results of that experiment?

A. You'll have to give me a moment.

Q. Yep.

A. I can't find any.
Q. Were you the first person to do any lab tests on NOX?
A. No.
Q. Who was the first person?
A. I don't know who would have been the first person.
Q. Who else has done lab NOX work in any significant amount other than you?
A. Probably Dr. Peele, Dr. Gentry, Mr. Riddick, myself would have all been involved in some form or fashion at various times.
Q. Was there some NOX lab work done in 1998?
A. I don't know for certain.
Q. When was -- what's your recollection of the first time NOX lab work was done?
A. Well, the experiments were run in '98 on the data that we discussed earlier.
Q. What data did we discuss earlier?
A. From the figure 2.
Q. Oh, right.
A. So that would be my first.
Q. Okay. So that was done.
Any other work that you were aware of

that was done prior to the time you started doing NOX lab work?

A. Well, along that same time frame as figure 2, I guess lab work would have been when Dr. Peele, I believe, exposed some tobaccos to NOX in the lab just to check that.

Q. Okay. Was the work you were doing in '99 in part directed to doing that lab work more thoroughly?

A. No.

Q. What conclusions did you reach from your work?

A. That NOX, when present with a tobacco alkaloid, has the ability to form nitrosamines.

Q. "Has the ability to form," what do you mean by that?

A. That it has the ability to nitrosate the alkaloid and form a nitrosamine.

Q. Okay. Did you make any effort to determine the nature or speed or any other characteristics of that activity?

A. I don't understand what you mean by "the nature."

Q. Did you make any effort to quantify that chemical reaction or what factors affected it?

A. We attempted to quantify to the best of our ability the amounts of nitrosamines that were formed.

And in some cases we were able to do so quite successfully, and others due to problems with just the experimentation nature of itself we were not.

Q. Okay. Describe the places where you were not able.

A. For instance, if we had a leak in a bag, then --

Q. Well, I don't mean an equipment breakdown.

Were there any experiments that you tried to carry out and did, in fact, carry out but weren't able to reach any conclusive results?

A. No. If we were able to carry out the experiment and run an analysis, then the data would speak for itself.

Q. Okay. Can you tell us where is the data that you collected as a result of your work?

In which of these documents would you find that data?

A. I see data associated with this work in Exhibit Gentry 40.

Q. Okay.
A. And Exhibit 217.
Q. All right. Tell us what part of exhibit -- or Gentry 40 summarizes work that you did.
A. What do you mean by "summarizes"?
Q. Reflects.
A. Okay. All of Gentry 40.
Q. Okay. Let's go to the second page, sample one.
What did you do with example one, and what results did you get?
A. In sample one, a pad was treated with 150 milligrams of a nicotine solution and placed into a bag and then without anything added to it other than air --
Q. Okay. What --
A. -- and analyzed.
Q. And the next one is sample six.
What happened in sample six?
A. The "ISO" stands for the isopropyl alcohol in which the nicotine solution was -- and that was the solvent for the nicotine solution.
So the isopropyl alcohol alone without the presence of a nicotine was treated on a pad and

exposed to 315 microliters of NOX for one hour and analyzed.

Q. Now, in the rest of these samples on this page, is it true that in each case there was 150 milligrams of the nicotine solution that was used and then something was added to it?

A. It appears.

Q. And the different -- what was added was different concentrations of NOX -- or excuse me -- different amounts of NOX?

A. In some cases different amounts of NOX, right.

Q. Tell me what happened in sample 8.

A. Sample 8, it appears that a pad was treated with 150 milligrams of nicotine solution, exposed to 100 microliters of NOX for 30 minutes.

Q. And what happened?

A. For the extraction method that was utilized in that particular sample, we did not measure -- we didn't measure any nitrosamines.

Q. Okay. What happened in sample two?

A. Sample two, it appears that a pad was treated with 150 milligrams of nicotine solution, 100 microliters of NOX was added into the bag for a ten-hour duration, extracted, and analyzed.

Q. Were any TSNAs detected?
A. In that particular sample, no.
Q. How do you explain that?
A. Again, you're asking me about a sample number two in which there were a number of samples that were ran early in this experiment to better understand how we should even extract, how we should treat these pads, how we should expose these pads.

It's difficult for me to be able to say that the method of exposure was the same for sample number two as sample number eight. As you can see, they're separated by a dark line, which would indicate to me that that was a separate experiment.

Q. Okay. Well, in any case, as you look at this data, there are some circumstances in which you add NOX to your nicotine solutions and get TSNAs and other circumstances where you add NOX to your nicotine solution and don't get TSNAs, correct?
A. Say that again.
Q. Your data reflects that in some cases you add NOX to the nicotine solution and get TSNAs and in other cases you add NOX to nicotine solution and don't get any TSNAs that you're able

to measure?

A. On these pads, that's correct.

Q. Well, were you able to determine why it was that sometimes you got a TSNA result and sometimes you didn't?

A. We had a lot of issues with the experimentation. Nicotine can be -- is very volatile. And so that may be part of the problem.

Like I say, early in the experimentation we had to try to understand how we would even expose these pads to NOX gas.

So there were several iterations in exactly how that occurred and also how long of an extraction period we would use to analyze these pads.

Q. Is it fair to say, Mr. Nestor, that when you first started out you had a number of situations where you weren't getting any TSNAs so you changed your experiment some?

A. It's fair to say that we evaluated different approaches to how we should do the experiment.

Q. And after you evaluated your various options, you selected one that resulted in TSNAs?

A. We selected one that gave us repeatable

results in a very scientific fashion.

Q. Right. And were you ever able to isolate or identify the reasons why sometimes you got no TSNAs when you added NOX to a nicotine solution?

A. Again, working with these tobacco alkaloids in a nontobacco matrix is very difficult because of their volatility, and the ability to keep them where you want them can be difficult.

Q. Was there a report or a compilation of the results that you put together?

A. No, I did not.

Q. Why not?

A. Again, we ran -- we had a lot of difficulty in terms of repeatability. We did the best that we could.

And because it's a nontobacco matrix, we did compile the data to the point of writing something up to share with the Swedish Match, but outside of that we did not do anything else.

Q. So there's a particular document that you authored that went to Swedish Match?

A. There was a presentation that was provided to them.

Q. A presentation.

Before we break for lunch, let me just ask you a few general questions, Mr. Nestor.

In 1999 when you were involved in initiating the NOX work, you were involved in the pilot program with the five farmers?

A. Correct.

Q. Exactly what was your role there?

A. Again, my role was to coordinate the delivery of tobaccos from the farms so that full tobacco and smoke chemistry analyses could be conducted on those tobaccos.

Q. Did you have any role in changing the equipment or altering the design of any of the equipment or altering any of the curing procedures that were used during the course of that pilot program?

MS. VITELLARO: Objection, foundation.

THE WITNESS: To my knowledge, no changes were made. I was not involved in any decisions regarding the insulation of heat exchangers.

BY MR. McMILLAN:

Q. You're not aware that fans were changed and fan configurations were changed and fan blades were changed?

A. I was not involved with that.

MS. VITELLARO: Objection to foundation.

BY MR. McMILLAN:

Q. Have you ever been involved in any analysis of heat exchange or design?

A. What do you mean?

Q. Any aspect of heat exchange or design. I'm just trying to understand what kind of subjects I should be asking you questions about this afternoon.

A. I have been provided samples, tobacco samples from flue-cured barns that have varying heat exchangers in them, and I've analyzed those tobaccos.

Q. When you say you have analyzed those tobaccos, what do you mean?

A. I've submitted them to the lab to be analyzed.

Q. Just turn to the two graphs that are in Exhibit 40, the one that looks like this.

The first graph, page number 6384, what does that show?

A. The one that's titled "Time versus TSNAs"?

Q. Yes.
A. It appears to be a graph of TSNA levels versus a time axis.
Q. Is there any underlying data that this is graphed from; do you know?
A. I'm sure there is, but I don't know exactly where it would be.
Q. Is this at some particular concentration?
A. I would have to see the data.
Q. Okay. How about the next graph, NOX versus TSNA -- did you put together this graph, by the way?
A. I don't know.
Q. Do you know what's depicted here?
A. NOX versus TSNAs.
Q. So -- and this is NOX in what, pounds or . . .
A. I can't tell from this the -- the axis identifier is covered up.
Q. Okay. Well, what's the environment that this graph is applicable to?
A. Again, I'd have to see the data to know.
Q. You're unable to tell me just from this

graph what -- what someone was trying to show here?
A. I would have to see the data to see the parameters involved.
Q. Okay. Well, is the data part of this exhibit?
A. You'll have to give me some time to look. I can't say for certain that it is.
Q. Turn to the last four pages of the exhibit starting with Bates number 6387, please.
First of all, there appears to be some sort of summary at the beginning.
What is that reflecting?
A. What exactly are you referring to?
Q. It says, "Standards," and it says "NNN, NAT, NAV, and NNK," and then there's some average below that.
It says, "Standards," and it says, "NNN, NAT/NAB, NNK, and then there's some averages and then there's a total -- well, there's a TSNA line.
What's reflected there?
A. As indicated, we have a standard that is run, and that one, two, three, four would represent the five replications of the standard being run throughout a series of experiments.

And that's your relative comparison point in order to interpretate (sic) the chromatographs and the areas that are provided in this data set.

Q. What does the TSNA line mean?

A. The TSNA milligrams per liter line?

Q. Yes.

A. That level, for instance, in the NNN column, 3.03 TSNA content, would correspond to a peak area of the 3595031.

Q. Now, on the right-hand column of this page, there is something entitled NNK NNN, and there's some values listed there for at least some of these.

What do those values mean?

A. That appears to be the NNK to NNN ratio.

Q. Why were you measuring the NN -- well, let me stop there.

It's the ratio of NNK to NNN?

A. Correct.

Q. So if the ratio was 1.34, that means there's 1.34 times more NNK than there is NNN?

A. Correct.

Q. Why were you looking at the NNK to NNN

ratio?

A. Based off of historical data in direct-fired barns, we knew that flue-cured's predominant nitrosamine was NNK.

And we also knew from data that there's approximately a ratio between NNK and NNN.

Q. And what approximately is that ratio?

A. It's approximately 1.5, but it can vary depending upon the tobacco sample.

Q. So historically in flue-cured barns, you were finding that the NNK to NNN ratio was 1.5 approximately?

A. Or higher.

Q. 1.5 or higher. What was the range?

A. I don't know off the top of my head.

Q. Approximately.

A. Again, it could vary by tobacco sample.

Q. What was the range?

A. It's safe to say that the NNK level was consistently higher than the NNN level, but how much higher, it can vary by tobacco sample.

Q. What about in barns equipped with heat exchangers, what is the characteristic ratio of NNK to NNN?

A. Both are significantly reduced down to

levels that are almost equivalent.

Q. Do you have a ratio?

A. It's approximately one to one.

Q. Approximately one to one, okay.

Why were you calculating the NNK to NNN ratio in your experiments in 1999?

A. Again, as a tieback to what happens in a flue-cured barn, if at all possible, to generate information pertaining to NNK versus NNN ratios and whether or not leading into what we see in flue-cured tobacco.

MR. McMILLAN: Why don't we break for lunch?

THE WITNESS: Sure.

THE VIDEOGRAPHER: Off the record at 12:27.

(Recess.)

THE VIDEOGRAPHER: Back on the record at 1:10. Please proceed.

BY MR. McMILLAN:

Q. Mr. Nestor, before we broke we were talking about some of the NOX work that you did in the summer of 1999 prior to the time your article was published in September of '99.

Let me go back to that subject. First

of all, would it be accurate to say that the NOX work that you did in the summer of '99 had inconclusive results?

A. No, I don't think that would be a fair assessment.

Q. Do you know whether any of the results or conclusions or work that you did in 1999 on the NOX issue made its way into your paper?

A. No, they did not.

Q. Do you know why it didn't, why they didn't?

A. Because the work that you're referring to that I did in 1999 was, again, outside the tobacco matrix, and the paper is referencing the tobacco.

Q. I see. So there wasn't anything about the work you did in 1999 that you found supportive?

A. Again, if I had to summarize the results of my experiments with the NOX and the alkaloids, it would be that we did show an interaction between tobacco alkaloids and NOX in its role in forming tobacco-specific nitrosamines.

Q. But you were unable to show an interaction that had very much similarity to the interaction you see in the actual commercial

tobacco farm world; would that be right?

MS. VITELLARO: Objection, foundation.

THE WITNESS: It would be safe to say that we had difficulties in even conducting experiments based on the equipment that we had available at extremely low concentrations.

BY MR. McMILLAN:

Q. Okay. In other words, you weren't able to prove out the hypothesis at extremely low concentrations?

A. We were unable to conduct the experiments.

Q. All right. Let me go through -- let me just see if you recognize this, and then we'll mark it.

Has that got anything to do with the Swedish Match or presentation that you referred to earlier?

A. Yes.

MR. McMILLAN: Okay. Well, let's mark that, and I'll substitute the yellow highlighted copy.

Can you mark that 219?

(Nestor Exhibit No. 219 was marked for identification.)

BY MR. McMILLAN:

Q. All right. We've marked as Exhibit 219 something entitled, "Formation of tobacco specific nitrosamines by reacting tobacco alkaloids with nitric oxide NOX."

What is that document?

A. This document was prepared and provided to Swedish Match.

Q. Were any conclusions or other documents provided to Swedish Match?

A. Again, we had shared with them the presentation, the results that we had obtained.

Q. Was that in writing?

A. What do you mean?

Q. Well, the thing you're holding in front of you is in writing. I'm asking whether anything else in writing was provided to Swedish Match.

A. Were there hard copies of a presentation provided?

Q. Yes.

A. Yes.

Q. Could you go back to the exhibit that is entitled "Outline for TSNA"?

The outline for TSNA presentation in is exhibit -- what's the exhibit number, Mr. Nestor?

A. 213.
Q. 213. Who prepared this?
A. I can't say for sure.
Q. Who do you think prepared it?
A. I'd have to speculate.
Q. Was it probably you?
A. It's a possibility.
Q. Do you know what this document is relating to?
A. I believe it's relating to the presentation that was provided to Swedish Match.
Q. Roman numeral three starts out by saying, quote, "Realizing that full NOX exposure was not relevant."
Do you know what that meant?
A. Meaning just exposing pads to a hundred percent concentration of NOX gas.
Q. Why was that not relevant?
A. It wasn't real world.
Q. Okay. Are these your handwritten notes?
A. These are my handwritten notes.
Q. Okay. Is this -- are these handwritten notes an effort to summarize in your own handwriting what the Roman numerals refer to?

A. The handwriting at the bottom is an effort to basically begin to lay out the presentation.

Q. Okay. Number four in your handwriting says, "Chart."

What does that say?

A. "Chart of NOX dosage."

Q. And then what?

A. "With table."

Q. "With table"?

A. What it appears to say, yes.

Q. Who made the presentation to Swedish Match?

A. I did.

Q. Anyone else?

A. Did anyone --

Q. Did anyone else attend?

A. Attend, yes.

Q. Who?

A. I don't know everyone that attended, but Dr. Gentry would have attended and Dr. Peele and Mr. Riddick.

Q. Who attended from Swedish Match?

A. Inger Wahlberg would have been there and some of her associates, and I don't remember

experiments of their own which emulated this, and that was the last collaboration that I've had with them.

Q. And did they carry through a set of experiments of their own?

A. I know that some were initiated, and I'm trying -- I don't remember if they were completed.

Q. Do you remember whether Swedish Match ever made a presentation to you?

A. There was not a presentation made back.

Q. Were any conclusions of the results of their work communicated back to you?

A. Again, there was correspondence, but I don't recall exactly what that correspondence was.

Q. Were their results inconclusive?

MS. VITELLARO: Objection, foundation.

THE WITNESS: Again, I don't remember what the correspondence contained.

BY MR. McMILLAN:

Q. Who was the correspondence with; do you remember?

A. It was a gentleman that had been contracted through Swedish Match.

Q. What was his name?

A. I couldn't begin to pronounce it. I really don't --

Q. It's a Swedish name?

A. It's not American.

Q. But where was he; do you know? Where did he work?

A. I assume he operated out of the Swedish Match facility, but I don't know.

Q. Showing you what's been marked as Gentry Deposition Exhibit No. 64, would that happen to be the Swedish Match presentation?

A. Yes.

Q. Now, there's a page here that says, "NOX dosage study," and unfortunately the copy we have is pretty hard to read.

Do you happen to know what I'd see if I looked in the left hand -- well, the left-hand column is a list of TSNAs, right?

A. And NNN, NAT, NAB and NNK.

Q. Right. And then the next column over, what was that?

MR. McMILLAN: Is there a way we can get a better copy of this?

MS. VITELLARO: I'll take it under advisement and see if we can.

BY MR. McMILLAN:

Q. Mr. Nestor, I'm showing you what's been marked as Nestor Deposition Exhibit 221.

Are these your notes?

A. They appear to be.

Q. The first line says, "Avoca and Swedish Match."

What does that mean?

A. This was a meeting of Swedish Match with R.J.R. personnel as we had talked about earlier as part of our collaborative work in understanding nitrosamine formation.

Q. Was this the same meeting where you made the presentation to them?

A. I'd have to go back and look at the date on the presentation to be able to say, but I don't believe so.

Q. It was July of '99.

A. These notes were dated March 7th of 2000, so . . .

Q. Is this some presentation by Swedish Match back to you?

A. These were my notes from the meeting. Whether it's just general discussion or a presentation, I don't know.

Q. About two-thirds of the way down, it says, "Water activity, amount of water available to bacteria in order for them to grow. Below .89 bacteria will not grow."

What does that mean?

A. Again, I was just taking notes. I'm not a microbiologist. I couldn't begin to really translate what that means.

Q. Do you know who made that statement?

A. Probably someone from Swedish Match.

Q. And you have no understanding of what it means?

A. Again, I'm not a microbiologist.

Q. I know. But you said earlier you were a scientist. So I was going to take whatever understanding you have.

A. I'm a scientist, and I'm very familiar with tobacco-related science. This is bacteria-related science that I am not familiar with.

Q. I see. Okay.

Do you remember who was present at this meeting?

A. Probably the same individuals that I referred to earlier.

(Nestor Exhibit No. 222 was marked for identification.)

BY MR. McMILLAN:

Q. I'm showing you what's been marked Nestor Exhibit No. 222.

That's a copy of an E-mail from Jeff Mallard to you dated June 4th, 2001, and the subject is "2001 flue-cured TSNA program two."

Then it says, quote, "Please find the listed names of R.J. RT contracted growers to be those selected in program two of the 2001 crop flue-cured TSNA program."

What's that in reference to?

A. I don't remember.

Q. Were you the overall coordinator of the 2001 TSNA program?

A. Oh, okay. You're talking about 2001. Program two, we had had a set of objectives, and that must be referring to one of those objectives in terms of program two.

Q. What were the set of objectives?

A. I would have to see the objective sheet to be able to speak to that.

MR. McMILLAN: Can we mark that, please?

Q. Okay. Several different objectives you mean?

A. Several research programs that were within what we were going to do in 2001.

Q. Do you remember any of those research programs?

A. Yes, I do.

Q. Okay. What ones do you remember?

A. One was we looked at carry-over tobacco, tobacco that had been cured in the year 2000 and had been carried over into the year 2001.

One program looked at tobaccos that had been cured in nonVencon Varsos heat exchange units. One was a tobacco tracking experiment in which we tracked tobacco from the barn through various stations, as you will, until the tobacco finally got to our inventory being the final point.

And then the last thing would have dealt with our standard inventory monitoring.

Q. What conclusions did you reach on that third project?

A. The tracking?

Q. The tracking project.

A. In the tracking experiment, we did not see any accumulation issues associated with

flue-cured tobacco at the sample points that we chose post curing.

Q. In other words, if TSNAs were low at the end of the cure, they stayed low?

A. If TSNAs were low and put up properly, they stayed low.

Q. What do you mean by "put up properly"?

A. Put up with proper moistures.

Q. What do you mean by "put up with proper moistures"?

A. If they weren't put up too wet, then there was no issues in terms of nitrosamine accumulation.

Q. I'm sorry, but I don't understand what the words "put up" mean.

A. As in baled. Once it's out of the barn. I apologize.

Q. Okay. So you found that if they were baled correctly without too much moistures, the TSNAs stayed low?

A. Correct.

Q. And if they were baled with too much moisture, what happened?

A. Then the ability for nitrosamine formation to occur was there, and in some cases we

A. I don't know what "right-hand man" is, but I reported to Dr. Gentry for some time.

Q. Were you the guy he turned to for sort of special projects?

A. I had a variety of projects under Dr. Gentry.

(Nestor Exhibit Nos. 228-229 were marked for identification.)

BY MR. McMILLAN:

Q. Let me show you what's been marked Exhibit 228. The first page of this document is on the letterhead of Sanders Company, Inc.

Do you know who that is?

A. No.

Q. The next page is entitled "Avoca nitrosamine experiments." And number one is talking about Star tobacco.

Were you involved in any of that work?

A. Yes.

Q. What was the purpose of that work?

A. I believe this was a repeat of what Dr. Peele had done previously.

Q. What was the purpose of what you and Dr. Peele did?

A. Well, a repeat in terms of exposing

tobaccos to NOX gas. In this case we had a Star tobacco sample as well.

Q. And what was the purpose of exposing Star tobacco to NOX gas?

A. Just see if it behaved any differently than what we had experienced with other flue-cured tobaccos.

Q. But this was Star tobacco that had already been cured?

A. That's correct.

Q. Why were you exposing it to NOX after it had been cured?

A. That's, again, what Dr. Peele had done initially as well.

Q. Why? What's the reason for doing that?

A. Just to see if the exposure to NOX gas would in any way change the nitrosamine level as it had been seen previously.

Q. Was there any result of that?

A. I'm sure there was.

Q. Do you know what it was?

A. I don't recall what it was.

Q. The next exhibit is 229. Is that your notes also?

A. It appears to be.

Q. It begins by saying, "Star tobacco 30 to 50 pounds of flue-cured strip."

Did there come a time when you or somebody that you were working for made a request to somebody for 30 to 50 pounds of Star tobacco?

A. No, I don't believe that was a request on our behalf. I think as it reads as a question is that I may have been told that there was some amount of flue-cured tobacco from Star that we had been given.

Q. And was that about 30 to 50 pounds?

A. As it turned out, I don't know that it was -- it may have been on the order of 30 or less, but I don't believe it was 50.

Q. And do you know where that 30 pounds came from?

A. No.

Q. When was that provided to you?

A. I don't know for sure.

Q. The latter part of 1998?

A. I don't know for sure.

Q. Do you know what you did with the 30 pounds?

A. Yes.

Q. What?

SIGNATURE OF THE WITNESS

SUBSCRIBED AND SWORN to before me this 10th day of, October 2002.

NOTARY PUBLIC

My Commission expires: April 8, 2007

OFFICIAL SEAL
Notary Public, North Carolina
COUNTY OF DAVIDSON
RENEE S. PREVETTE
My Commission Expires 4-8-2007

ERRATA SHEET FOR THE TRANSCRIPT OF:

Notice Date: September 17, 2002
Case Name: Star Scientific, Inc. vs. R. J. Reynolds Tobacco Co.
Case Number: AW 01-CV-1504
Dep. Date: August 29, 2002
Deponent: Tim Nestor
Place: Chicago IL
Ref. No.: 4706-2

CORRECTIONS:

Page	Line	Now Reads	Should Read	Reasons Therefore
18	15	buying tobaccos	by tobacco	Wrong form of word
20	18	agent	aging	Wrong word
121	11	here's a	hearsay	Wrong word
129	7	NATP	NAT	Incorrect spelling
130	12	Lynn's	LIMS	Wrong word
132	1	lamina sample	LIMS system	Wrong words

Signature of Deponent

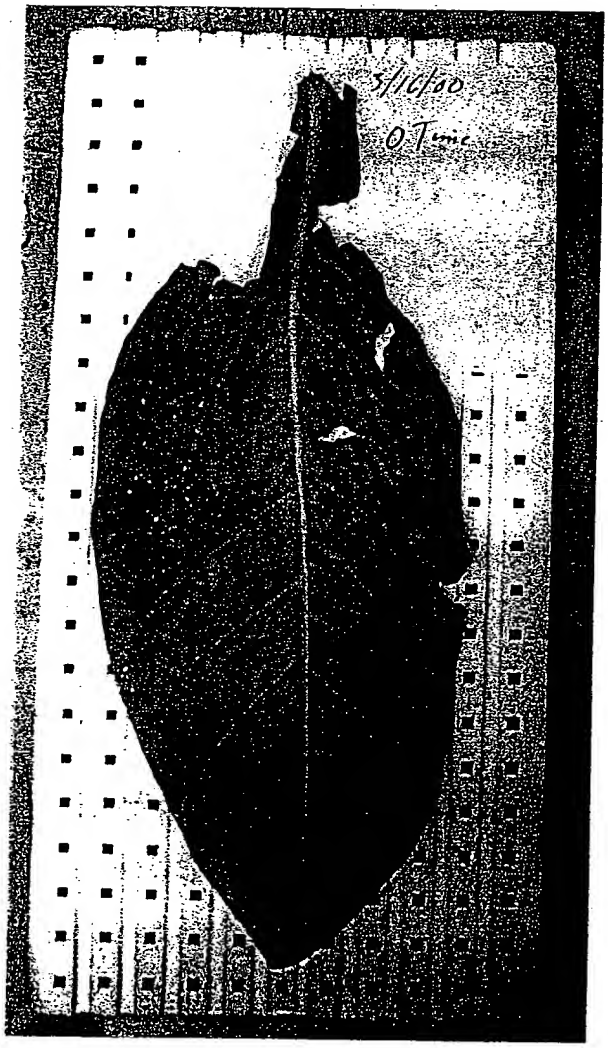
10/09/02

A method for modifying a tobacco curing barn provided with a direct fire heating unit for the purpose of providing conditions suitable for curing tobacco such that resulting cured tobacco obtained from said barn possesses a tobacco specific nitrosamine content lower than that obtained prior to such modification, the method comprising:

removing the direct fire heating unit from the tobacco barn,

providing the tobacco barn with a heating unit that does not generate exhaust gases comprising nitric oxides in a fashion that would cause contact between said nitric oxides and said tobacco within said barn, and further modifying said barn to permit correlation of the specific nitrosamine content of said cured tobacco with the actual level of nitric oxides to which said tobacco is exposed in said barn, wherein said barn as modified may be used for the curing of tobacco leaves.

Tobacco type	NNN	NAT/NAB	NNK	TOTAL	Nicotine mg/g	Total-N mg/g
Flue cured control	1.10	1.89	1.35	4.34	38.3	30.9
Flue cured at 21% moisture	1.28	1.99	1.48	4.76	38.5	30.3
Flue cured run #9	1.29	2.06	1.66	5.02	40.0	30.2
Flue cured run #10	1.30	1.97	1.60	4.87	41.1	29.1
Flue cured run #1	1.57	2.38	2.20	6.15	41.3	31.5
Flue cured run #3 (Stem burn)	1.32	2.03	1.67	5.03	41.7	31.6
Burley control dry	2.71	2.58	0.18	5.47	47.5	47.0
Burley at 17% moisture	3.17	3.07	0.20	6.44	48.6	47.6
Burley run # 11	2.89	2.62	0.15	5.66	45.9	47.3
Burley run #7	3.38	2.80	0.13	6.30	46.3	48.2
Burley run #6	3.24	2.82	0.21	6.26	47.8	47.5
Burley run #5	3.48	3.05	0.19	6.72	46.5	48.6
Burley run #4	2.96	2.68	0.15	5.79	48.3	47.9


3/1/1980
OT mic

BROWN & WILLIAMSON TOBACCO
RESEARCH & DEVELOPMENT

FAX TRANSMITTAL
March 9, 2000

	No. of Pages:
To: Dr. Harold Burton	From: Pat Dearing
Company:	Telephone No.:
Panafax No.: 1-608-257-7125	Panafax No.: (912) 464-4014

Dear Doctor Burton:

Here is the information on the samples given to you by Mr. Williams.

The flue cured tobacco is grade B4F and the burley tobacco is grade B3F as graded by USDA.

Flue Cured
1 pound flue cured moisture at 12%
4 pounds flue cured moisture at 21.5%
The moisture was raised by applying steam.

Burley
1 pound burley moisture at 12%
4 pounds burley moisture at 18.99%
Moisture was reached by applying 4% sugar water.

If you have any other questions, please feel free to call me at 912-464-3517.

Pat Dearing
Pat Dearing

FAX

University of Kentucky
Department of Agronomy
N-122 Agricultural Science Center North
Lexington, Kentucky 40546-0091 U.S.A.

Date: _____

Number of pages
(including cover sheet) _____

To: Ron DeLmundo
Stephen Minnon Zinn
MacLeod + Stern

Fax Phone: 202 293-7860
Phone: _____

From: H Burton

Fax Phone: (606) 257-7125
Phone: 606 257-7501

REMARKS:

Ron:

KHB

August 28, 1998

Rom Delmendo
Sughrue Mion Zinn Macpeak &Seas
Washington DC 20037

Dear Rom:

Jonnie Williams wanted me to send you a brief statement on what occurs during flue curing of tobacco and would make this curing unique. I am not an expert in the flue cure tobacco, since it is not produced in Kentucky. Certainly I am more familiar with the air-curing process and know that I have qualified my expertise here goes the discussion.

Tobacco specific nitrosamines (TSNA) are formed primarily during the curing process. I have observed that TSNA in cured tobacco leaf are dependent on the accumulation of nitrite in the leaf during curing. I have been postulated that nitrite accumulates during curing by the reduction of nitrate. Nitrite accumulates during the death of the cell and experimental evidence indicates that it is formed by the micro flora on the surface of the leaf. It must be noted that for the micro flora to reduce nitrate to nitrite conditions should be approaching anaerobic (oxygen deficient) conditions. If conditions are aerobic, the microbes will use the oxygen in the atmosphere for their energy source. If the curing in a micro climate is aerobic then no nitrite will form. The curing process is certainly more complex than this explanation but it should give a thumbnail sketch on what is happening during curing.

I was in China for two weeks during 1997 and I was given commercial Chinese cigarettes. I brought some of them back to the US and decided to analyze them for TSNA. To my surprise I could not detect TSNA or when I did they were very low. We analyzed at least five different commercial cigarettes and the were the leading cigarettes in China. These cigarettes were made of only flue cured tobacco and are more like the cigarettes manufactured in England. China does not import any tobacco and therefore it was all grown in China. Since China is a developing country, they are still use the old curing technology that was abandoned in the US during the sixties. It seemed to me that the probable cause for the absence of TSNA was their use of the old flue-curing techniques. This technique uses burning fuel and passing the hot gases through flue pipes in the curing barn. Therefore, tobacco in the old barns were exposed to radiant heat. The modern curing barns are different since the fuel source (propane) is combusted and the exhaust is passed directly through the tobacco. This can create anaerobic condition since the oxygen in the atmosphere is depleted by combustion and the combustion gases (carbon dioxide and water) are not aerobic. During curing the tobacco leaf also emits carbon dioxide and will dilute the oxygen further.

On Monday, August 24, 1998, when I was visiting the Cape City plant I noticed a furnace Star Tobacco had attached to its MicroDry drier. That is when I found out that most of the bulk curing units have furnaces which exhaust the combustion gases through the tobacco. This seemed like the process may contribute an atmosphere that could cause accumulation of nitrite and subsequently TSNA.

Hopefully this short discourse will aid you in the patent application. If you have any further questions please call me.

Sincerely,

Harold R. Burton

DEPOSITION EXHIBIT 53

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#39 Hor 2-3-00

In re Application of:	)
Jonnie R. WILLIAMS	)
Serial No.: 08/998,043	) Group Art Unit: 1731
Filed: December 23, 1997	) Examiner: Ruller, J.
For: TOBACCO PRODUCTS HAVING REDUCED NITROSAMINE CONTENT	) Atty. Dkt. No.: 04859.84699

DECLARATION OF HAROLD R. BURTON, Ph.D.

Honorable Assistant Commissioner for Patents
Washington, DC 20231

Sir:

I, Harold R. Burton, Ph.D., hereby declare as follows.

1. I am an Associate Professor of Agronomy at the University of Kentucky, College of Agriculture, in Lexington, Kentucky. I have been on the faculty of the College of Agriculture for 33 years. I have an extensive background in the areas of organo-analytical chemistry relating to agronomy, particularly in the fields of tobacco chemistry and science. I have published widely in this field.

2. I am a consultant for Star Scientific, Inc., the exclusive licensee of the above-captioned application.

3. I am familiar with the above-captioned application. I also have studied the Office Action dated February 23, 2000 (hereinafter "the Office Action").

DEPOSITION EXHIBIT 67

Heljo U.S. Patent 2,758,603

4. I have studied and am familiar with Heljo U.S. Patent 2,758,603 cited in the Office Action. The Heljo process is designed for use by the cigarette processor as a conditioning step just before cigarette manufacture. Note that Example II, which treats a mixture suitable for cigarettes, states that upon completion of the heating "... the tobacco is allowed to stand at room temperature for about 24 hours. It is then flavored and is ready to be made into cigarettes." Similarly Example III states "the tobacco is allowed to stand for about 24 hours at room temperature and it is then mixed with the other tobacco components, cut to size, flavored and made into cigarettes."

5. Heljo is not and does not purport to be a curing process. Indeed, given the short heating times and the fact that the tobacco is treated with steam to increase its moisture content to 18-25%, it is clear that the tobacco treated by the Heljo process is already fully cured as that term is conventionally used by tobacco growers. I am confident that the reference to curing is a reference to conditioning (or aging) and the reference to "uncured" is a reference to tobacco that has been cured but has not been fully aged. Heating cured tobacco to accelerate aging is employed in some countries.

6. Heljo describes applying radio frequency heating to tobacco. The electromagnetic energy has a frequency of 16 to 60 megacycles (MHZ) (column 2, lines 37-41). The tobacco is heated to 80°C to 120°C for a period of 1 to 3 minutes. Prior to the high frequency heating of Heljo, the dried (cured) tobacco contains significant levels of nitrosamines, including 4-(N-nitrosomethylamino)-1-(3-pyridyl)-1-butanone (NNK), which are formed predominately during conventional tobacco curing.

7. My own research and experience have shown that applying high frequency energy to already cured tobacco does not significantly promote decomposition of NNK and therefore does not

significantly reduce NNK content in the tobacco product. The TSNA content of cured tobacco is difficult to reduce once the nitrosamines are formed during curing. Therefore, it was clear to me that the process of Heljo would not be effective to significantly reduce the TSNA or NNK content of the tobacco.

8. I was present and personally observed the tests reported in the Hudson Declaration.

9. The tobacco samples were prepared by Brown and Williamson as shown in Attachment A. As Mr. Hudson states, the tobacco was heated in transparent Ziploc storage bags and in runs 9, 10 and 11 additional water was added to the bags to simulate the introduction of steam through aperture 19. I caused the untreated controls and the treated tobacco products of Test Runs Nos. 7, 9, 10 and 11 to be analyzed following freeze-drying of the products so that the results are on a comparable (dry) basis. The results were as follows:

	NNN (μg/g)	NAT/NAB (μg/g)	NNK (μg/g)	TSNA (μg/g)	Nicotine (mg/g)	Total N (mg/g)
Flue cured Control	1.10	1.89	1.35	4.34	38.3	30.9
Run #9	1.29	2.06	1.66	5.02	40.0	30.2
Run #10	1.30	1.97	1.60	4.87	41.1	29.1
Burley Control	2.71	2.58	0.18	5.47	47.5	47.0
Run #7	3.38	2.80	0.13	6.30	46.3	48.2
Run #11	2.89	2.62	0.15	5.66	45.9	47.3

The nitrosamine contents were measured using a commercial Nitrosamine Specific Detector manufactured by Thermedics. The nitrogen contents were measured by a conventional Kjedhal procedure.

10. Upon completion of the heating the tobacco gave off a pungent odor as referred to by Heljo at col 4, lines 1-2. Nonetheless, the above results demonstrate the heating was not effective to reduce the tobacco-specific nitrosamine (TSNA) or NNK content. This was not unexpected.

11. The tests reported by Mr. Hudson are appropriate to demonstrate the results obtained by Heljo.

12. The above results together with similar analyses of earlier runs is attached as Attachment B. This is provided simply to complete the record. Note that none of the tests resulted in any significant reduction in NNK content.

Marley et al. U.S. Patent 4,790,335

13. I am also familiar with and have studied Marley et al. U.S. Patent 4,790,335 cited in the Office Action. The Marley patent describes an apparatus for curing tobacco which employs a gas tank (typically propane) for fueling dual heating systems which heat separate chambers (52, 54) for curing the leaves and stems, respectively. Combustion exhaust gases produced by burning propane (or other fuel source) in heater blowers 40 and 42 are circulated through the chambers during curing of the tobacco. Marley does not describe taking any steps to remove combustion exhaust gases from the chambers and, indeed, direct-fired heating was a conventional method of curing tobacco.

14. I note that the Marley patent reports "degrees" but does not state whether they are Fahrenheit or Centigrade. I am confident that one of ordinary skill in the art would understand that the degrees are, in fact, Fahrenheit. I say that for two reasons. First, the temperatures reported in the Marley patent closely parallel the temperatures (in °F) employed for conventional flue curing. Secondly, the conversion of chlorophyll is enzymatic and enzymes are generally inactivated at temperatures well below 105°C. See e.g. Dixon, Enzymes, p. 146, Academic Press, 1964. Inactivation of those enzymes deprive the plant of its ability to move beyond the initial green state. Nevertheless, to

confirm this, I also caused green tobacco to be heated at 105°C for 18 minutes. As expected, this treatment set in the green color and failed to yellow the tobacco, as shown in Attachment C.

15. I personally observed the tests reported in the Lamb Declaration and can state that the green tobacco which was subjected to heating was not unusually moist, nor was the humidity high at the time of the test. Once again, I was not surprised at the results. I expected that short heating regimen of the Marley patent would "set" the green color of the leaf and that is exactly what occurred as demonstrated by the photographs accompanying the Lamb Declaration.

16. Marley relies solely on direct-fired heating to obtain the desired temperatures. The use of direct-fired heating actually contributes to the formation of nitrosamines. Combustion products react with components in the tobacco leaf to form nitrosamines.

17. The tests reported by Mr. Lamb are appropriate to demonstrate the results obtained following the teaching of the Marley patent.

Other Matters

18. Comparing the content of NNK or other nitrosamine in a particular tobacco product to the corresponding content in a control, which was treated and cured in accordance with conventional techniques, is a standard used and understood in the art. A person skilled in the art would be able to ascertain by appropriate analysis the content of NNK or other nitrosamine in a given tobacco product in relation to the corresponding content in tobacco which was cured in accordance with conventional techniques.

19. I can confirm that the phrase 'normal nicotine content' of a tobacco variety is a phrase which is understood by one skilled in the art.

I hereby acknowledge that all statements made herein of my own knowledge are true and that all statements made herein on information and belief are believed to be true. I acknowledge that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. § 1001), and may jeopardize the validity of the application or any patent issuing thereon.

Date: 3/27/00

Harold R. Burton

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